

A Qualitative Investigation into Smokers' and Non-Smokers' Accounts of E- cigarettes

**G L Wilson
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A Qualitative Investigation into Smokers' and Non-Smokers' Accounts of E-cigarette

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ABSTRACT

Background: Around 3.2 million adults currently use e-cigarettes (ECs) in the United Kingdom (UK) and there are now more ex-smokers (2.5 million) using ECs than current smokers (1.9 million). Despite growing acceptance that combustion is the major harm from tobacco, the controversies surrounding tobacco harm reduction (THR) and ECs in particular have become progressively fraught. Ambiguity and fluctuating guidelines, combined with an abundance of conflicting information on regulations, brands, flavours, and models have led to public uncertainty, distrust and misunderstanding of ECs. It is important to develop a broad understanding of EC accounts from a diverse range adults with varied EC/smoking experiences so practical guidance can be given to health professionals and policymakers.

Aim: To understand the facilitators and barriers of EC use in adult smokers and non-smokers.

Method: This exploratory research consists of a multi-method programme of three distinct but overlapping qualitative studies. The first study (Study One) consisted of an online open-ended questionnaire methodology to generate initial ideas about smokers' and non-smokers' accounts of ECs. The second study (Study Two) consisted of semi-structured interviews to add further insight into the results obtained from the first study. Both Study One and Study Two were analysed using inductive thematic analysis. The final study consisted of a focus group methodology to understand how people use language to communicate perceptions of ECs using blended discourse analysis informed by discursive perspectives.

Results: Data were collected between October 2019 and May 2020, in total, 73 participants took part in the research. An examination of the triangulated outcomes from all three studies indicated that the encouraging and deterring factors ECs for adult smokers and non-smokers are related to three overarching factors. Social factors (1) relate to the utilisation and understanding of the social representations of ECs. Informative factors (2) capture the impact of conflicting EC related communication in shaping EC understanding. Practical factors (3) captures how device functionality and health implications are experienced. These findings demonstrate the variability of EC experiences, it is therefore important not expect homogeneous patterns.

Conclusion: This thesis presents a number of novel contributions to the existing literature on facilitators and barriers of EC use. There are varying levels of social acceptability and associated stigma between EC devices, irrespective of conventional tobacco cigarettes (CTC) use. Encouraging a flexible growth mindset may be useful in reducing such stigma and subsequently may be beneficial in terms of THR. Findings also suggest the potential benefits of EC peer support networks within cessation services for those struggling with the functional aspects of the devices. It is also important to consider the 'next steps' for ex-smokers who continue using ECs but wish to discontinue.

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List of Abbreviations

British Psychological Society - BPS

Centre for Development, Evaluation, Complexity and Implementation in Public Health Improvement - DECIPHer

Centre for Disease Control and Prevention - CDC

Conventional Tobacco Cigarettes – CTCs

Discourse Analysis – DA

Discursive Psychology -DP

Electronic Cigarettes – ECs

The Electronic Cigarettes Priority Setting Partnership - ECPSP

Electronic Nicotine Delivery Systems – ENDs

E-cigarette, or Vaping, Product Use-Associated Lung Injury – EVALI

Focus Groups - FGs

Food and Drug Administration - FDA

General Products Safety Directive – GPSD

Generic Qualitative Approach

Generic Qualitative Research - GQR

Health Belief Model - HMB

Medicines and Healthcare Product Regulatory Agency - MHPRa

Nicotine Replacement Therapy – NRT

Open-Ended Questionnaires - OEQs

Public Health England - PHE

Royal College of Physicians – RCP

Protection and Motivation Theory – PMT

Randomized Control Trials – RCTs

Semi Structured Interviews – SSI

Social Learning Theory - SLT

Stop Smoking Services – SSS

Tetrahydrocannabinol - THC

The Theory of Planned Behaviour – TPB

The Theory of Reasoned Action – ToRA

Thematic Analysis - TA

Therapeutic Goods Administration – TGA

Tobacco Control Plan -TCP
Tobacco Free Initiative – TFI
Tobacco Harm Reduction - THR
Tobacco Products Directive - TPD
Transtheoretical Model of Behaviour Change – TTM
United Kingdom – UK
UK Centre for Tobacco and Alcohol Studies - UKCTAS
UK Vaping Industry Association - UKVIA
United States – US
Vaping Associated Pulmonary Illness - VAPI
World Health Organisation – WHO

Chapter I – Overview of Thesis

The following chapter aims to provide an overview of the thesis. The chapter will begin by providing the relevant contextual background, followed by the aims, objectives and rationale for the research. The position of the researcher will then be disclosed followed by the contribution to knowledge generated from this thesis. Finally, the chapter will conclude with a structural overview of the thesis.

1.1 Background

ECs are electronic devices that use battery powered heating elements to heat a nicotine containing liquid solution that is vapourised into an aerosol or ‘vapour’ that can be inhaled (Mathur and Dempsey, 2018), hence, why those who use ECs are often referred to as ‘vapers’ (Polosa et al., 2017). ECs emerged in 2003 as smoking cessation devices and were introduced in the UK in 2007 (Hartman-Boyce et al., 2018). ECs are now the most popular aid to smoking cessation in England (ASH, 2020) and are used by around 3.2 million adults (6.3%). Over half (58.9%) of current vapers successfully quit smoking using ECs. The amount of vapers who also smoke conventional tobacco cigarettes (CTCs), referred to as dual users, has declined in recent years (38.3%). EC use among never-smokers (emerging demographic) remains significantly lower (0.3%, amounting to 2.9% of all vapers) (ASH, 2020).

Public Health England (PHE) and the Royal College of Physicians (RCP) claim that ECs are 95% less harmful than CTCs (RCP, 2016; PHE, 2019), although these figures have been contested by others (Glantz, 2015; Kalkhoran and Glantz, 2016; Eissenberg et al., 2020; WHO, 2020b). As a result of these disagreements, ECs are often a topic of controversy. Hyperbolic media stories have polarised views and intensified what has always been a divisive debate. Dispute is often focused on the unknown long-term health risks (Pisinger and Døssing, 2014), their efficacy as a cessation device (Leduc and Quiox, 2015), use by never-smokers and/or minors (Etter, 2017; Farsalinos, 2018), the role of flavours (Romijnders et al., 2019) and the effect of the second-hand vapour (SHV) on bystanders (Czogala et al., 2014). Alternative concerns about ECs are often linked to apprehensions regarding the risks of long-term addiction to nicotine (Benowitz, 2009). This reflects the misconceptions regarding the risks of nicotine alone versus the risks of nicotine in a CTC. These issues are intertwined, but to make them more complex, they are debated against

the backdrop of fears that Big Tobacco will dominate the EC marketplace (de Andrade et al., 2018).

A significant amount has changed since the introduction of ECs in 2007 in the UK. Initially there were calls for medicinal licensing and outright bans. The following years have seen the UK emerge as one of the firmest supporters of ECs in regard to tobacco harm reduction (THR). There has been a governmental commitment to incorporate evidence-based innovation that minimises the risk of harm, alongside stringent tobacco control policies. Globally, ECs remain at a policy crossroad, the forthcoming years will be a watershed, setting the standards for years to come. It is a pivotal era in both THR and combustible tobacco. It is impossible to ignore the fast-moving drama surrounding ECs regardless of individual involvement.

1.2 Rationale

As the body of conflicting research continues to build on both sides of the debate, ECs remain a polarising issue. Amid the controversy and with this unsettled backdrop in mind, individuals make sense of their own reality (Farrimond, 2017). During this time of global uncertainty and given the vital role of perception in behaviour (Ferguson and Bargh, 2004; Coleman et al., 2015), understanding public perception of ECs has never been more necessary. Previous research suggests that EC understanding and related behaviours are determined by personal experience and history of smoking, meaning a continuum of opinions exist (Rooke et al., 2016). However, significant gaps remain and there is a lack of qualitatively rich understanding of how UK adults with varied EC/smoking statuses conceptualise ECs and how these translate into facilitators and barriers.

Developing an understanding and appreciation of the differences and similarities in the accounts of a diverse range of people with varied EC/smoking statuses can provide useful and practical guidance. Information generated from this thesis will be useful in tailoring health communication strategies to educate the public about ECs. Additionally, findings from this thesis can inform policymakers on the most effective ways to legislate ECs in terms of the best outcomes for THR.

1.3 Aims and Objectives

Overall Thesis Aim:

To understand the facilitators and barriers of EC use in adult smokers and non-smokers

Overall Research Question:

What are the factors that act as facilitators and barriers for EC use in adult smokers and non-smokers?

Individual Objectives:

Generate initial ideas about EC behaviour and opinion in adult smokers and non-smokers by exploring: what are the factors that influence EC behaviour and opinion in adult smokers and non-smokers? (Chapter 4 – Study One)

Provide further insight to the results obtained in Study One by exploring: what are the factors that encourage and deter EC use in adult smokers and non-smokers? (Chapter 5 – Study Two)

Understand how EC accounts are discussed in social contexts by exploring: How do adults use language to communicate perceptions of ECs? (Chapter 6 – Study Three)

1.4 Overview of the Approach

This research is theoretically underpinned by interpretivism, adopting a subjectivist epistemology and a relativist ontology. The research is an exploratory multi-method programme, comprising of three distinct but overlapping qualitative studies. This research uses a Generic Qualitative Research (GQR) methodology, a blended methodological approach which seeks to understand the perspectives and worldviews of people involved.

All three studies in this thesis recruited participants using opportunity sampling. Participants were required to be over 18 and speak English. The sample consisted of a diverse range of participants with varied EC/smoking statuses to capture a range of accounts, allowing maximum variation to provide a rich but broad answer to the research question.

The first study consisted of an online open-ended questionnaire (OeQ) which was posted online in October 2018 and gathered 51 responses by January 2019 when data collection stopped. Data were analysed using inductive thematic analysis. Study Two aimed to provide a more in-depth insight and build upon the findings from the first study. Semi-structured interviews (n=12) were conducted between March 2019 and December 2019. Data collection stopped when theoretical saturation was reached. Data were analysed using inductive thematic analysis. The final study consisted of two focus groups (FG1: n=4, FG2: n=6) to explore how people use language to communicate perceptions of ECs. Data were collected between January 2020 and May 2020 and analysed using blended discourse analysis (DA) informed by discursive perspectives.

1.5 Position of Researcher

It is important to consider the biography and positioning of the researcher when interpreting this thesis. I am a 26-year-old non-smoking white woman with a BSc in psychology and a MSc in research psychology. My approach to research is integrative, as I recognise a variety of influences from a diverse range of models and theories on my thinking and subsequently on my work, as I believe that integrative thinking is progressive and transformative. It allows for flexibility and provides a comprehensive understanding of the world. This form of flexibility means that I am accepting of blended methodologies that can be adapted depending on the research questions. This is reflected in my decision to use GQR methodology, a blended methodological approach, as well as my decision to use blended DA in Study Three.

Although I appreciate the value of integrative thinking, my position as a researcher is more aligned with interpretivism rather than positivism. I believe that humans attach different meaning to experience and multiple qualitative methods can be employed in research to reflect different aspects of this issue. Therefore, I value the ability of qualitative methods to connect with true human essence when compared with quantitative methods.

My biography as a PhD psychology student as well as THR advocate may have subconsciously affected the academic texts and literature I selected to guide my research. It also may have affected how I approached all three studies in the thesis, and what I expected to identify from the data. It is not only my personal and academic biography that may have influenced any methodological, epistemological and ontological research

decisions I made. The complex interaction between the social, interpersonal political and institutional contexts by which I exist will have also played a role in shaping my decisions (Mauthner and Doucet, 2003). Reflections on the research process can be found in Section 7.8.

1.6 Contribution to Knowledge

The findings from this thesis concluded that social, informative and practical factors act as facilitators and barriers of EC use. Social factors relate to the utilisation and understanding of the social representations of ECs. Informative factors capture the impact of conflicting EC related communication in shaping understanding. Practical factors frame how device functionality and health implications are experienced. Many of the findings complemented alternative work, but some were novel, highlighting a unique contribution to knowledge. The first novel finding from this thesis is the revelation of the varying levels of social acceptability between EC devices regardless of CTCs. EC acceptability is facilitated by ideas that bigger devices are associated with recreational use, whereas smaller devices are associated with cessation attempts.

Encouraging a flexible growth mindset may be useful in reducing such stigma and subsequently may be beneficial in terms of THR. A flexible mindset can potentially reduce exclusive thinking about EC/smoking identity categories which is beneficial when considering that most people smoke on the journey to permanent quitting. Findings also highlight the importance of shared peer-to-peer knowledge between EC users in facilitating quit attempts and overcoming functionality difficulties. It is also important to consider 'next steps' for ex-smokers who wish to discontinue using their EC.

1.7 Structure of Thesis

This thesis consists of three studies, each using an exploratory qualitative approach to contribute to understanding the key factors that act as facilitators and barriers to ECs for smokers and non-smokers. The following section will outline the structure of the thesis.

Chapter II – Literature Review

This chapter presents some of the current literature surrounding ECs, exploring their history, prevalence and perception with a focus on the social, political and media discourse

that surrounds them. This chapter presents this issues and identifies the gaps within the existing literature to provide a rationale for this thesis.

Chapter III – Research Methodology

This chapter provides an overview of the broader epistemological, ontological, methodological and ethical considerations of the research as well as the execution of the research strategy. The use of the qualitative methodology and analyses are justified, as well as the frameworks followed to ensure respectable analyses and credibility of the research findings. The research design for individual studies is discussed and justified, and all relevant ethical and practical issues are considered.

Chapter IV – Study One: What are the factors that influence EC behaviour and opinion in adult smokers and non-smokers?

This chapter forms the first study within the thesis which consists of an OeQ design to generate initial ideas about smokers' and non-smokers' accounts of ECs. Study One addresses the research question: 'what are the factors that influence EC behaviour and opinion in adult smokers and non-smokers?'. The data gathered from this study were analysed using inductive thematic analysis at the latent level. Findings are discussed with reference to relevant theory and literature.

Chapter V – Study Two: What are the factors that encourage and deter EC use in adult smokers and non-smokers?

This chapter aims to provide a more in-depth insight and build upon the findings from the first study, by using semi-structured interviews (SSIs) to probe individual EC accounts to consolidate factors that encourage and deter EC use. This chapter aims to address the research question: 'what are the factors that act as facilitators and barriers for EC use in adult smokers and non-smokers?' using the same form of analysis (inductive thematic analysis at the latent level) as Study One (Chapter 4). The outcomes from the analysis are discussed with reference to relevant theory and literature.

Chapter VI – Study Three: How do adults use language to communicate perceptions of ECs?

This chapter forms the third and final study within this thesis, which utilised a focus group (FG) methodology to address the research question: 'how do adult smokers and non-smokers use language to communicate perceptions of ECs?', using blended DA informed by discursive perspectives to concentrate on talk between speakers, highlighting meaning around the use of ECs and generating an understanding of how they are debated and disputed within groups. The outcomes from the analysis are discussed with reference to relevant theory and literature.

Chapter VII – Data Triangulation and Discussion

The final chapter in this thesis triangulates the findings from all three studies and discusses these findings in depth to provide a comprehensive answer to the research question. This chapter discusses the advancements made by the thesis towards an understanding of the facilitators and barriers of ECs for smokers and non-smokers. The chapter ends with recommendations for future research, the strengths and limitations of the thesis, concluding comments and reflexivity of the research process.

Chapter II – Literature review

2.1 Introduction to Literature Review

The previous chapter provided an overview of the thesis. This chapter aims to illuminate the context through which the thesis will be developed. Although this research will focus on the perceptions of ECs in the UK, the review of relevant literature is formed from a holistic overview of ECs globally.

This chapter will present the relevant literature whilst highlighting important gaps, positioning this thesis in the wider context so that the research questions are framed and justified. Advocates both for and against EC use have the foundations of their opinions rooted in an era preceding the existence of ECs. Therefore, to provide a comprehensive insight into this subject, this literature review starts with a concise historical overview of nicotine and tobacco. This is imperative as it provides an understanding of the ongoing debate surrounding ECs, sculpting the intricate web of complex factors that shape perceptions. It then goes on to explore the emergence of ECs, global regulation, regulation in the UK, followed by a summary of the important milestones for ECs and current prevalence trends in the UK. The literature review then explores reasons for use, followed by relevant models and theories of behaviour. Alternative harm reduction prospects as well as ECs as smoking cessation devices are discussed. Social concerns are then explored, with a focus on the social, political and media discourses that influence perceptions such as: dual use, the gateway theory, renormalisation and denormalisation, stigmatisation and 'addict' identity. The chapter concludes with a discussion about how the previously mentioned interconnecting factors that surround ECs are brought together and impact adult smokers' and non-smokers' perceptions of ECs, therefore providing a robust rationale for the current thesis which aims to explore and understand these perceptions.

2.2 Search Strategy

The literature review was ongoing over the three years this thesis was written and alerts were set up with databases and journals. The literature was searched using both key words and combinations of key words (descriptors). Truncation (*) was used to include words that shared the truncated root word, examples include e-cigarette, e-cigarettes, e-cigs, ecig. Search expanders were used to search for terms within text, as well as title and Boolean operators. No time parameters were set in relation to the search, due to ECs and

accompanying research being relatively novel and all of relevance. Literature needed to be in English or have translated versions. The review focused on pertinent global studies even though the research was conducted in the UK. Primary literature was searched for using online databases via institutional access. In addition, citations and references from identified papers were explored. Due to the wide array of literature surrounding ECs, not all studies were included in this review. The studies included were selected by the author based on their ability to form a coherent and detailed contextual background for this specific thesis.

2.3 Literature Review

2.3.1 A Short History of Tobacco and Nicotine

Tobacco consumption began in the 16th century, initially to treat specific illnesses such as: epilepsy, coughs, headaches and intestinal worms (Doll, 2004; Milne, 2011). Cultivation in the 17th century resulted in high tobacco consumption in the UK (Mold, 2011). CTCs (both manufactured and hand-rolled) were, and remain to be, the most common method of consuming tobacco (WHO, 2020b). Manufactured CTCs are regular factory-made filtered cigarettes that are ready to smoke (Dani and Balfour, 2011). Hand rolled cigarettes or roll-your-own (RYO) are assembled by the user with cigarette papers, loose tobacco and filters, they can also be made using special rolling machines (Dani and Balfour, 2011). Eventually mass manufacturing of tobacco developed a global habit, instigating what is now known as the smoking epidemic, which was accentuated by the expansion of colossal international tobacco corporations paired with powerful promotions, advertisements and glamorisation of certain brands (Doll, 2004; Thun and Henley 2004; RCP, 2007).

The harmful effects of tobacco began to emerge in the 19th century (Dani and Balfour, 2011). From then, the morbidities and mortalities as a result of consumption became increasingly apparent. It is currently estimated that there are around 8 million deaths internationally per year as a result of tobacco (WHO, 2020a). Rightly, anti-tobacco policies are of major importance and public health bodies have been increasingly successful at promulgating the harmful effects of consumption in recent decades. Although global death rates from tobacco are high, it is important to point out that they have fallen in recent years, from 146 per 100,000 people in 1990, to 90 per 100,000 people in 2017 (Ritchie and Roser, 2019).

2.3.2 Nicotine

It is now acknowledged that nicotine is the addictive constituent of tobacco and is the key motivator in individual decisions to maintain a smoking habit, regardless of the evident and pronounced risks (Cox and Jakes, 2017). During the early twentieth century, theories of addiction were polarised between two key models (Pickard et al., 2015). The first regarded addiction as 'moral failure' and the second, as a neurological brain disease (Pickard et al., 2015). Although, these models are outdated and nicotine dependence is now understood as a complex biopsychosocial phenomenon (Cohen et al., 2003) that is influenced by many variables along multiple biological, cognitive, social and emotional dimensions (Cohen et al., 2003). Physiologically, nicotine activates reward pathways in the brain, which increases the release of dopamine, a neurotransmitter that controls feelings of pleasure (West and Brown, 2013). Psychologically, the pleasure experienced from the secretion of dopamine once the nicotine has reached the brain dissipates quickly, which can result in individual decisions to repeat the smoking behaviour to maintain the reward and prevent withdrawal (Benowitz, 2009). The model also emphasises that human behaviour does not take place in a vacuum, acknowledging the impact of social influences such as modelling, peer pressure and family influence on such behaviours (Bandura, 1997b; Hill et al., 2005). Although the factors that contribute to nicotine addiction are complex and multifaceted, it is clear that once a nicotine dependency develops, there is often extreme difficulty in quitting (Cohen et al., 2003).

The global addiction to nicotine has caused extensive concern. This reflects the misconceptions regarding the risks of nicotine alone versus the risks of nicotine in a CTC. Nicotine alone is relatively harmless when compared to the effects of CTC smoking on the body (WHO, 2020b). A CTC contains nicotine, but also contains carcinogens (Hecht, 1999; Sasco et al., 2004; Hecht, 2012). Therefore, the consumption of nicotine through a CTC is significantly more toxic than if nicotine were to be consumed without tobacco (Henningfield et al., 2004). Nicotine can be obtained through a range of products which vary in their level of potential harm to the user, from smoked tobacco (CTC) which is one of the more harmful methods of consuming nicotine, to medicinal nicotine, one of the least harmful (Dani and Balfour, 2011).

For this reason, THR strategies encourage smokers who have difficulty stopping smoking to use nicotine in a less harmful form, ideally resulting in the ultimate cessation of nicotine use

altogether (National Institute for Health Care Excellence, 2020). The aim is to reduce the inhalation of the products generated from combusted tobacco, as it is these products that are predominantly responsible for fatal smoking related illnesses. Regulated and safer forms of nicotine therefore have the potential to substantially improve public health (Fagerström and Bridgman, 2014).

Harm reduction strategies are universally accepted in other health-related fields, such as opiate addiction. They are actively endorsed by the World Health Organisation (WHO) and officially legislated in several countries across the globe (Bullen et al., 2016). Supporting smokers in quitting is one of the most urgent priorities in health care as CTC smoking is the leading preventable cause of premature death worldwide (WHO, 2020a). Harm reduction strategies for tobacco use have been proposed for decades with a focus on lower-risk alternatives to CTCs (Farsalinos, 2017). Critics of the harm-reduction approach claim that these strategies create the perception that there are safe ways of undertaking certain behaviours (smoking), which could eventually lead to an increase in these behaviours in individuals who would otherwise be deterred (Hathaway, 2001). Other controversies over THR are in part based on the experience of low-yield CTCs which turned out to be just as risky as their comparators, resulting in taboo around working with tobacco industries (Farrimond, 2016).

The most commonly used smoking cessation medications are nicotine replacement therapies (NRTs) which have been around since 1970s (Mold, 2011). Research has demonstrated that these medications are relatively safe and can improve smoking cessation prospects when compared to placebos (Eisenburg et al., 2008; Stead and Lancaster, 2012; Suissa et al., 2017). However, their long-term success rates are generally low, lower than 7% when assessing smoking status after one year (Moore et al., 2009).

In CTC smoking, nicotine reaches the brain in around 10-20 seconds (Berridge et al., 2010). The relatively low success rate of NRTs and other forms of drug-based therapies aimed at addressing nicotine addiction is attributed to the longer speed of delivery when compared to CTCs (Farsalinos, 2017). Another element that may contribute to their lack of success is that they do not address the behavioural-sensory aspects of CTC smoking, such as the hand-to-mouth movements, which become pleasurable by association and eventually become a central aspect of the addiction (Benowitz, 2009; Farsalinos, 2017).

2.3.3 The Emergence of Electronic Cigarettes (ECs)

ECs, also known as electronic nicotine delivery systems (ENDs), vapes, e-hookahs, e-pipes hookah pens or e-cigars (Adkison et al., 2013; Gostin and Glasner, 2014; Zhu et al., 2014) are electronic devices that use battery-powered (usually lithium) heating elements to heat an atomizer where a nicotine containing liquid solution (typically of glycerine and/or propylene glycol) is vapourised into an aerosol or 'vapour' that can be inhaled (Figure 1; Mathur and Dempsey, 2018). When an EC is activated, an airflow sensor activates a battery which in turn heats the atomizer, vaporising the glycerine and nicotine, resulting in a dose of nicotine delivered to the lungs, the residual aerosol is then exhaled (Trtchounian et al., 2010). Additional components of ECs include the USB vehicle, portable wall and personal chargers, which are required as the power source. CTCs produce smoke from combustion, but as there is no combustion in an EC, they produce vapour in the form of a fine mist of aerosol droplets that dissipates to vapour significantly quicker than the combusted products from a CTC. Hence why CTCs are 'smoked', and ECs are 'vaped'; for this reason, those who use ECs are often referred to as 'vapers' (Polosa et al., 2017). This term is also used throughout this thesis when referring to those who use ECs.

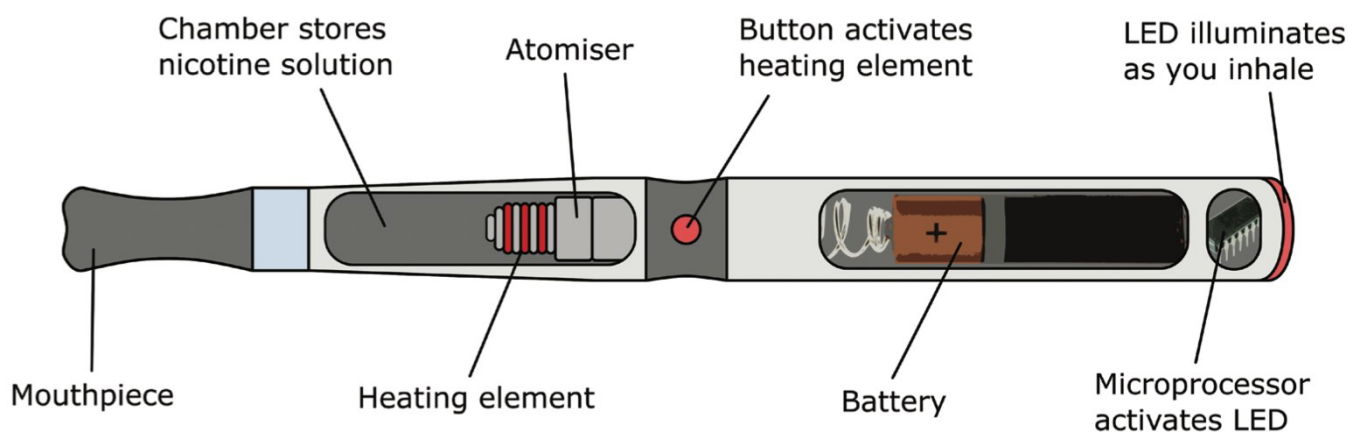


Figure 1 E-cigarette (Mathur and Dempsey, 2018)

Herbert Gilbert first invented ECs in 1963; a patent was filed for the invention in 1965, but it was never commercialised. Hon Lik a Chinese pharmacist was credited for the device in 2003 as a smoking cessation device (Hartman-Boyce, 2018). Since their re-emergence in 2003, product innovation has been rapid. It has been estimated that there are over 460

brands and 7500 flavours (Zhu et al., 2014), although these numbers are likely to have increased significantly since this estimate was made. Over the years the emerging brands have differed from the initial models with varying colours, accessories, weights, flavours and amounts of nicotine. The majority of current vapers (73%) claim to use only one device (ASH, 2020). Physically, their appearance can vary considerably, but generally they can be classified into four main categories: (1) first generation cigarette-style devices; (2) second generation pen devices; (3) third generation mod devices and (4) fourth generation pod devices (Figure 2; Mathur and Dempsey, 2018).



Figure 2: E-cigarette Generations (Mathur and Dempsey, 2018)

2.3.3.1 First Generation Devices

Typically, these devices are a similar shape and size to a CTC. They contain small lithium batteries and cartomizers. Cartomizers contain small holders that are usually prefilled with nicotine and flavouring agent liquid, which bathes the atomizer. Batteries are usually

disposable but sometimes they can be rechargeable. First generation ECs are usually designed so that the tip is illuminated (typically blue or red) when the vapour is being inhaled to mimic the aesthetic of a CTC (Farsalinos and Polosa, 2014). It is important to point out that in 2020, first generation ECs are largely obsolete and are rarely manufactured.

2.3.3.2 Second Generation Devices

The key difference between these devices and first-generation devices is that these atomizers can be refilled, and the batteries usually run at a higher capacity. Refillable liquids can be sold in separate bottles and it is possible to change the head of the atomizer in some second generation devices, which means there is potential for users to lower maintenance costs. Typically, these devices have a button, which controls the electricity supply and the coil heating elements which are used to inhale vapour (Farsalinos and Polosa, 2014).

2.3.3.3 Third Generation Devices

Third generation devices consist of a larger lithium battery with varied combined circuits which allow users to control the power delivered. Third generation ECs can be combined with reusable atomizers, providing users with the ability to customise the resistance and wick. They can also be combined with second generation atomizers (Farsalinos and Polosa, 2014). In the UK, these are the most popular devices (ASH, 2020).

2.3.3.4 Fourth Generation Devices

The fourth generation EC device is the most recent and powerful device on the market (Martin and Dempsey, 2018). They usually look like stainless-steel cylindrical containers and contain less plastic than the previously discussed devices (Martin and Dempsey, 2018). They contain a temperature regulating system as well as lower resistance coils to produce bigger more flavourful vapours. Some fourth generation devices also incorporate nicotine salts into the associated liquids, these are supposed to more accurately mimic the nicotine 'hit' of CTCs (Kamerow, 2018). There has been an increase in use of these devices, from 14% to 18% in 2020 (ASH, 2020).

2.3.4 E-liquid Flavours

There are now over 7500 flavours (Zhu et al., 2014) ranging from tobacco to confectionary flavours such as chocolate or cherry. E-liquid usually contains around 10-40mg/ml of flavouring chemicals (Tierney et al., 2015). Flavours have caused controversy among health experts, some argue that these confectionary and sweet flavours which imitate common foods, sweets and liquors may encourage EC use among younger generations (Primack et al., 2015; Rigotti, 2015; Bonhomme et al., 2016; Marcham and Springston, 2017), mirroring the 'alco-pop' marketing scheme due to 'fun' flavours (Choi et al., 2012; Hilton et al., 2016; Measham et al., 2016). This is understandable as research has demonstrated that sweeter flavour e-liquids (e.g., confectionary and fruit) are more commonly used by younger people. A combination of flavours such as 'Skittles and Red Bull' (Measham et al., 2017, p11) are also popular among this demographic. Whereas tobacco flavours are increasingly relevant to adult users (Harrell et al., 2017; St. Helen et al., 2017; Villanti et al., 2017; Morean et al., 2018; Romijnders et al., 2019).

To manufacture these flavours, a range of natural and artificial flavouring agents are used. Some of these flavouring agents are commonly used in food products (Marcham and Springston, 2017), which is monitored by the Food Standards Agency in the UK (Food Standards Agency, 2015) to ensure that they are safe to use and digest. Although these products may be safe to digest, it does not mean the same can be said about them when they are inhaled, presenting potential health concerns (Marcham and Springston, 2017). Additionally, the majority of the flavouring chemicals in ECs also contain aldehydes, which are a primary irritant of the mucosal tissue of the respiratory tract (Tierney et al., 2016).

The safety of the flavourings in e-liquids are often a topic of controversy, but it is difficult to truly monitor their risks to health as the surrounding literature indicates there is great variety in the levels of flavouring agent in each individual e-liquid product (Leigh et al., 2016). In some liquids the concentration of the flavour additives is higher than the recommended intake values, meaning the flavours could cause their own biological concerns when inhaled (Tierney et al., 2016). Although, research has found that it is the ability to enjoy ECs in ways such as personalising and customising liquids and flavours that has made them successful in aiding smoking cessation when compared to other types of NRTs (Kim et al., 2016). Therefore, it is logical to suggest that it is important to maintain flavour variability, as banning such products may harm vapers who are attempting to quit smoking (PHE, 2020).

Moreover, the risk of flavours attracting minors, children or other at risk groups, can be minimised by implementing restrictions that prohibit sales to these groups (Farsalinos, 2018).

According to ASH (2020) and PHE (2019), around a quarter of vapers would still try and get flavours, even if regulations were stricter. In the countries where flavoured liquids are banned (Global Tobacco Control, 2020), research has demonstrated that the effectiveness of flavour bans are comprised by the non-compliance of retailers (Yang et al., 2020). It is logical to assume this would happen elsewhere, and therefore rational to suggest that it is safer for consumers to have access to flavoured e-liquids that are regulated, rather than unregulated and therefore potentially unsafe e-liquid flavours (PHE, 2019).

On the discussion of flavoured e-liquids, it is also important to discuss the impact of the recent menthol cigarette ban in the UK. Menthol cigarettes were banned in the UK as of 20th May 2020. The European Union (EU) Tobacco Product Directive (TPD) restricted the sale of all CTCs with a 'characterising flavour' as part of a wider campaign to discourage people from taking up smoking. As menthol is typically the most common type of flavoured CTC, the directive has been dubbed the menthol ban. A scoping review exploring the effects of implemented menthol bans, hypothetical bans and implemented flavour bans that exclude menthol in other countries indicated that menthol bans reduced CTC sales and subsequently increased smoking cessation rates (Cadham et al., 2020).

The UK Vaping Association Industry (UKVIA) predicts that the ban will also cause a spike in smokers switching to vaping as menthol CTCs made smoking more available for those who dislike the taste of standard CTCs. However, this is contested as the tobacco industry have been introducing various RYO menthol flavoured accessories, which undermines the ban and encourages smokers to switch to RYO rather than quit (Hiscock et al., 2020).

2.3.5 Global Regulation

There is still a considerable lack of international consensus over the role of ECs, meaning challenges arise as jurisdictions determine how to regulate them. Differences in regulation have been characterised as an ideologically driven debate between harm reduction and abstinence approaches to drug use (Bell and Keane, 2012). In 2013, the WHO Tobacco Free Initiative (TFI) produced a report to provide countries with assistance in developing

policies to regulate ECs (WHO, 2013). Suggestions included, but were not limited to, prohibiting EC use where CTC smoking is also illegal; advocating a legal age of sale for ECs which should mirror the law for CTCs; applying the same marketing restrictions as CTCs; banning marketing techniques that cobrand ECs and CTCs in a manner that will promote dual use; prohibiting the characterising e-liquid flavours and forbidding companies making unproven marketing claims about ECs (WHO, 2013; Kennedy et al., 2017). Table 1 (below) captures a brief summary of the divergent regulatory regimes per country.

Table 1

Key Differences in Regulation Across a Variety of Countries (Global Tobacco Control, 2020)

Regulation	Counties
EC sale allowed with sale regulation	Afghanistan, Austria, Belgium, Bulgaria, China, Canada, Croatia, Cyprus, Czech Republic, Denmark, Djibouti, Ecuador, Egypt, Estonia, Fiji, Finland, France, Georgia, Germany, Greece, Honduras, Hungary, Iceland, Indonesia, Iraq, Ireland, Italy, Ivory Coast, Jamaica, Jordan, S. Korea, Latvia, Libya, Liechtenstein, Lithuania, Luxembourg, Malaysia, Maldives, Malta, Moldova, Morocco, Netherlands, New Zealand, Norway, Palau, Pakistan, Philippines, Poland, Portugal, Romania, San Marino, Saudi Arabia, Slovakia, Slovenia, Spain, Sudan, Sweden, Switzerland, Tajikistan, Togo, Tunisia, Ukraine, United Arab Emirates, United Kingdom, Vietnam, Yemen
Nicotine (and/or other EC contents) are regulated with laws varying slightly between each country	Austria, Belgium, Bulgaria, Canada, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Israel, Italy, Latvia, Lithuania, Luxembourg, Malta, Moldova, Netherlands, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, and United Kingdom.
EC sale and distribution is banned	Antigua and Barbuda, Argentina, Australia, Bahrain, Barbados, Bhutan, Brazil, Brunei Darussalam, Cambodia, Colombia, Costa Rica, Ethiopia, Gambia, India, Iran, Japan, N. Korea, Kuwait, Lao PDR,

	Lebanon, Mauritius, Mexico, Nepal, Nicaragua, Oman, Palestine, Panama, Qatar, Seychelles, Singapore, Sri Lanka, Suriname, Syria, Thailand, Timor-Leste, Turkey, Turkmenistan, Uganda, Uruguay, Vatican City, Venezuela
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2.3.6 Regulation in the UK

Until recently in the UK, all EC devices were sold under the General Products Safety Directive (GPSD) as a less harmful substitute for CTCs (Andrade et al., 2013). Initially the UK Medicines and Healthcare Product Regulatory Agency (MHPR) intended to regulate all nicotine-containing ECs as medicinal products, but these plans were suspended following the introduction of the TPD in May 2014. The TPD is a directive of the EU which establishes the legislation of the sale and merchandising of tobacco and tobacco related products across the EU. The main aim is to ensure citizens are protected. In 2016, the UK Tobacco and Related Products Regulations (TRPR) implemented the TPD in full (House of Commons Library, 2017) mirroring that of the EU.

The TPD policy implemented by countries in the EU, can be described as the 'twin-track' approach. Primary products are regulated through tobacco legislation, but stronger e-liquids can be regulated as medicines, this has resulted in a ban of the majority of EC advertisement. This pragmatic and proactive stance encompasses promoting ECs as less harmful nicotine delivery devices to adults who are attempting to quit smoking, whilst also putting in place policies to protect youths, such as a minimum age of sale, which is 18 in the UK. EC regulations are required to be reviewed every five years. The core elements of the UK's EC regulation are highlighted below:

2.3.6.1 Nicotine Strength

- ECs containing up to 20mg per ml of nicotine are regulated as consumer products
- ECs containing over 20mg per ml of nicotine need a medicinal licence to be sold lawfully
- 0mg per ml nicotine products do not require a medicinal licence

2.3.6.2 Quantity of E-liquid

- Disposable ECs and related products such as tanks and cartridges can contain a maximum of 2ml of e-liquid
- EC refill products can contain up to 10ml of e-liquid

2.3.6.3 Safety and Health Warnings

- All EC devices and related products must be child-resistant
- Thirty percent of EC packaging must be covered with a health warning stating 'This product contains nicotine which is a highly addictive substance'
- Concerns about ECs should be reported to the MHPRA through the Yellow Card report scheme by both professionals and consumers

2.3.6.4 Marketing

- Marketing communications for ECs must be socially responsible, containing nothing which promotes any design, imagery or logo style that might reasonably be associated in the audience's mind with a tobacco brand. They must contain nothing which promotes the use of a tobacco product or shows the use of a tobacco product in a positive light (Advertising Standards Agency, 2020)
- Marketing communications must make clear that the product is an EC and not a tobacco product (Advertising Standards Agency, 2020)
- Marketing communications must not contain medicinal claims unless the product is authorised for those purposes by the MHRA. ECs may be presented as an alternative to tobacco but marketers must do nothing to undermine the message that quitting tobacco use is the best option for health (Advertising Standards Agency, 2020)
- Marketers must not use health professionals to endorse ECs (Advertising Standards Agency, 2020)
- Marketing communications must state clearly if the product contains nicotine. They may also include factual information about other product ingredients
- Marketing communications must not encourage non-smokers or non-nicotine-users to use ECs (Advertising Standards Agency, 2020)

- Marketing communications must not be likely to appeal particularly to people under 18, especially by reflecting or being associated with youth culture. They should not feature or portray real or fictitious characters who are likely to appeal particularly to people under 18. People shown using ECs or playing a significant role should not be shown behaving in an adolescent or juvenile manner (Advertising Standards Agency, 2020)
- People shown using ECs or playing a significant role must neither be, nor seem to be, under 25. People under 25 may be shown in an incidental role but must be obviously not using ECs (Advertising Standards Agency, 2020)
- Except for media targeted exclusively to the trade, marketing communications with the direct or indirect effect of promoting nicotine-containing ECs and their components which are not licensed as medicines are not permitted in the following media:
 - Newspapers, magazines and periodicals
 - Online media and some other forms of electronic media

As Britain is no longer an EU member state, it is important to consider the impact of this on UK EC and e-liquid regulations. As previously discussed, the British vaping industry is regulated by TRPR, which is the UK's implementation of the TPD. The current version of the TPD was published by the EU in 2014, so as an EU Member State the UK was obliged to bring these regulations into force. As part of the Tobacco Control Plan (TCP) published in 2017, the government committed to reviewing the TRPR once the UK has left the EU (Department of Health, 2017). The first major milestone will be the publication of the report on the implementation of the TPD2, which must be published by 20 May 2021. The report is intended to inform the updating of the directive in response to changes in technology and legal developments. A summary of the important milestones for ECs in the UK is can be found below (Section 2.3.7).

2.3.7 Summary of Important Milestones in for ECs¹

1963 Herbert A. Gilbert devised the first device that closely resembled the modern EC

1964-1999 Tobacco companies worked on producing CTCs that did not rely on combustion

2003 First commercially successfully EC by Hon Lik, a Chinese pharmacist

¹ These events have been selected for the purpose of this UK based thesis; they do not disclose every significant event in the history of ECs

2005-2007 EC introduced to Europe and the United States

2008 WHO claim ECs are not legitimate smoking cessation devices – demands marketers to remove any materials suggesting that they are effective in doing so

2009 Action on Smoking and Health, recognise that alternative products which deliver nicotine in a safer way than CTCs, such as ECs, should be available to the public

2010 First ‘VapeFest’ is held in the UK

2011 *The American Journal of Preventive Medicine*, *BioMed Central* and *Addiction Journal* produce studies indicating the promise of ECs

2013 The MHPRA state that once ECs are licensed they will be regulated and available as over-the counter medicine

2015 a minimum age of sale for ECs of 18 was introduced in the UK

2016 National Centre for Smoking Cessation and Training (NCSCT) issues a briefing (NCSCT, 2016) providing evidence-based recommendations on ECs for Stop Smoking Services (SSS)

2016 The RCP issue a report titled ‘Nicotine without smoke: tobacco harm reduction’ (RCP, 2016) which examined the scientific and political sphere surrounding ECs and other non-tobacco sources of nicotine, addressing controversies and providing evidence-based conclusions

2016 The UK TRPR implemented the TPD in full (yellow card system was put in place)

2017 UK Centre for Tobacco and Alcohol Studies (UKCTAS), PHE, ASH, and the Centre for Development, Evaluation, Complexity and Implementation in Public Health Improvement (DECIPHer) conduct large study on ECs and youth use in the UK and find no evidence that they eventually lead young people to smoke (Bauld et al., 2017)

2018 As part of the TCP and in response to the House of Commons Science and Technology Committee’s report on ECs (House of Commons Science and Technology Committee, 2018), the UK government agree with recommendations for a review of EC regulation to ‘identify scope for change post-Brexit’

2018 PHE publish ‘Evidence review of ECs and heated tobacco products 2018’, (PHE, 2018) which reiterates that vaping is at least 95% less harmful than smoking

2018 The Secretary of State for Health and Social Care publishes a report (Secretary of State for Health and Social Care, 2018) concluding that ECs are being overlooked as smoking cessation tools, explicitly stating the importance of distinguishing them from CTCs

2019 An outbreak of severe vaping associated lung illnesses - EC, or vaping, product use-associated lung injury (EVALI), almost exclusively within the US, is linked to tetrahydrocannabinol (THC) and vitamin E acetate

2020 WHO receive backlash from UK researchers after expressing concerns about the value of ECs

2020 Covid-19 outbreak, a respiratory lung disease – some researchers claim that smoking makes the symptoms worse and vaping increases the risk of infection (Glantz, 2020)

2020 Britain leaves the EU, potential changes to EC and e-liquid regulation on the horizon

2.3.8 Prevalence in the UK

ECs continue to increase in popularity in the UK (ASH, 2020) and awareness is widespread among the adult population, 94% of smokers and 93% of the general population have heard of ECs (ASH, 2020). As previously discussed around 3.2 million adults (6.3%) in the UK currently use ECs. Just over half (58.9%) of current vapers quit smoking use ECs and are now ex-smokers. Vapers who also smoke CTCs, referred to as dual users (explored in Section 2.2.15) has declined in recent years (39.8%) (ASH, 2020). EC use among never-smokers (referred to as the emerging demographic) remains significantly lower (0.3%, amounting to 2.9% of all vapers). Table 2 displays the percentage of users per age group in the UK (ASH, 2020).

Table 2

EC Prevalence Across Age Groups in the UK

Age group	Percentage of UK population
18-24	4.3%
25-34	7.8%
35-44	9.5%
45-54	9.3%
55+	5.6%

In the last 20 years, adult smoking rates in England have fallen by a third. Data suggest that ECs have played a significant role in these reductions. Firstly, because there are 3.2 million adults using them, over half of those have quit smoking as a result. They are the most

popular method for smoking cessation and prevalence trends in the UK indicate significant declines in smoking rates (ASH, 2020).

There is little difference in EC use by gender², with 7.3% of males and 6.9% of females claiming that they currently use ECs. Females were more likely to have tried ECs (38% vs. 27%) than males (ASH, 2020). There are some differences in EC use by socioeconomic status. Research has demonstrated lower socioeconomic position is associated with higher rates of smoking and EC use (Kock et al., 2019; Green et al., 2020).

2.3.9 Reasons for Use

Research methods exploring the reasons for EC use vary and stem from cross-sectional surveys (Etter and Bullen, 2011; Foulds et al., 2011; Dawkins et al., 2013; Adkison et al., 2013; Goniewicz et al., 2013; Richardson et al., 2013; Sussan et al., 2017; Bunch et al., 2018; Lewek et al., 2019); qualitative interviews (McQueen et al., 2011; Barbeau et al., 2013; Wadsworth et al., 2016; Simmons et al., 2016; Harrell et al., 2019; Brown et al., 2020); surveys (Etter and Bullen, 2014; Berg et al., 2014; Best et al., 2017; Etter, 2018; ASH, 2020) and systematic reviews (Pepper and Brewer, 2013; Farsalinos and Polosa, 2014; Pisinger and Døssing, 2014; Hartwell et al., 2017).

Motivation for initiating EC use is varied, reasons stem from both hedonic and utilitarian factors (Kim et al., 2016). Reported reasons for use include: quitting or cutting down CTC smoking (Etter and Bullen, 2011; Dawkins et al., 2013; Sussan et al., 2017; ASH, 2020), dealing with withdrawal symptoms from tobacco (Etter, 2011; Etter, 2015; ASH, 2020), perceptions that ECs are less harmful than CTCs (Dawkins et al., 2013; Ashford et al., 2016; ASH, 2020), avoiding CTC relapse (Etter, 2015; Etter, 2016; ASH, 2020), as an alternative for where smoking is banned (Gubner et al., 2016) and found to be cheaper than CTCs (Etter, 2011). They also appeal to users as they have a tobacco-free smell; are more socially acceptable; have an innovative design and there is variation on flavours, as well as the opportunity for customisation (Vandrevala et al., 2017). ECs are now the most common aid for those looking to quit smoking in England (Wise, 2016; ASH, 2020). The efficacy of ECs as a smoking cessation device is discussed in Section 2.2.14. The main reason given by ex-smokers for using ECs is primarily to aid cessation attempts (31%) and prevent

² Those who identify as

relapse (20%). Current smokers mainly report using ECs to cut down (21%) and save money (16%). Never smokers mainly try vaping just to give it a try (73%) and continue because it is enjoyable (13%) (ASH, 2020).

2.3.10 Models of Behaviour

Contemporary research exploring health behaviour has become progressively grounded in theory (Glanz et al., 2009). The following section will explore some of the dominant theories and models of health-related behaviours in psychology. As previously discussed, the author of this thesis is theoretically integrative, acknowledging a variety of models and theories on knowledge. Additionally, the research is exploratory, so it is important to discuss a variety of theories and models to explain EC behaviour when providing the literary background to this thesis.

Models and theories of behaviour attempt to guide and understand behavioural changes, including, but not limited, to the COM-B model of behaviour change (Michie et al., 2011); the theory of planned behaviour (TPB; Ajzen, 1991); the health belief model (HBM; Rosenstock, 1974); and the transtheoretical model of behaviour change (TTM; Prochaska and DiClemente, 1984). It is assumed that these models and theories can be used as conceptual frameworks when conducting health research. The models have been used in the past to understand smoking behaviours in the aim of developing more effective smoking cessation and prevention methods. The following sections will outline these models and their relevancy to ECs and related behaviours.

2.3.10.1 COM-B Model of Behaviour Change

The COM-B Model of behaviour change (illustrated below in Figure 3) proposes that the capability (C), opportunity (O) and motivation (M) are required to accomplish a given behaviour (B) (West and Brown, 2013). The model states that for behaviour to change, all three of the previously mentioned conditions must be met (West and Brown, 2013).

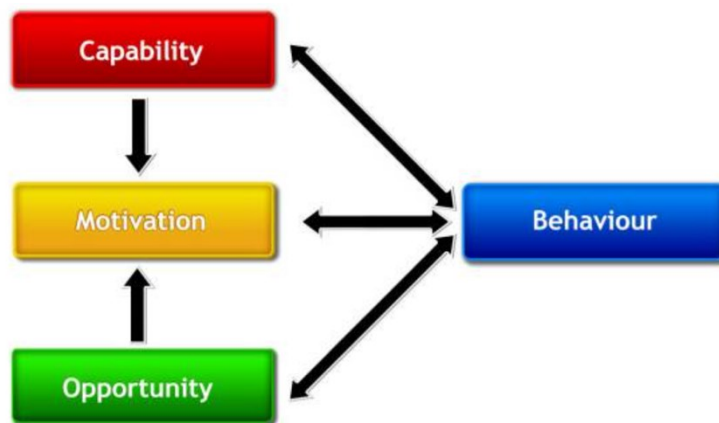


Figure 3: COM-B model of Behaviour Change (Michie et al., 2011)

Critique of the model comes from the notion that the constructs of the model are too ill-defined to provide an in-depth understanding of behaviour change (Michie et al., 2011). Wadsworth et al. (2016) conducted a qualitative study exploring how and why smokers initiated EC use and applied the findings to the COM-B model. EC use (behaviour) was facilitated by (1: capability) the physical ability to use them combined with the psychological understanding that they are less harmful than CTC smoking; (2: opportunity) access to environments and social situations that facilitates use; (3: motivation) conscious decision-making about EC use fueled by encouraging thoughts and feelings about them (Wadsworth et al., 2016).

The model was also applied to the prevention of EC initiation, this was facilitated by (1: lack of capability) insufficient and unavailable information in regard to the general safety and efficacy of the devices when compared to CTC smoking; (2: lack of opportunity) uncertainty about the acceptability of ECs in social situations, as well as the social pressure not to use an EC (particularly from family or friends); (3: lack of motivation) personal beliefs such as the idea that ECs are a fad and do not work, deep personal enjoyment for CTC smoking, and concerns about the efficacy of ECs in helping them break the habit (Wadsworth et al., 2016).

2.3.10.2 The Theory of Planned Behaviour (TPB)

The Theory of Planned Behaviour (TPB) is an extension of the Theory of Reasoned Action (ToRA), emphasises how influences placed upon an individual regulate health-related behavioural decisions (Ajzen, 1991). TPB aims to explain all given behaviours in situations whereby individuals have the ability to exert self-control. According to the theory, the predominant determinant of behaviour is intention (Ajzen, 1991). Behavioural intention summarises a person's motivation to perform a particular behaviour and indicates how much effort and time they are willing to devote to performing that behaviour (Rivis and Sheeran, 2003). The key notions of the TPB are illustrated below in Figure 4.

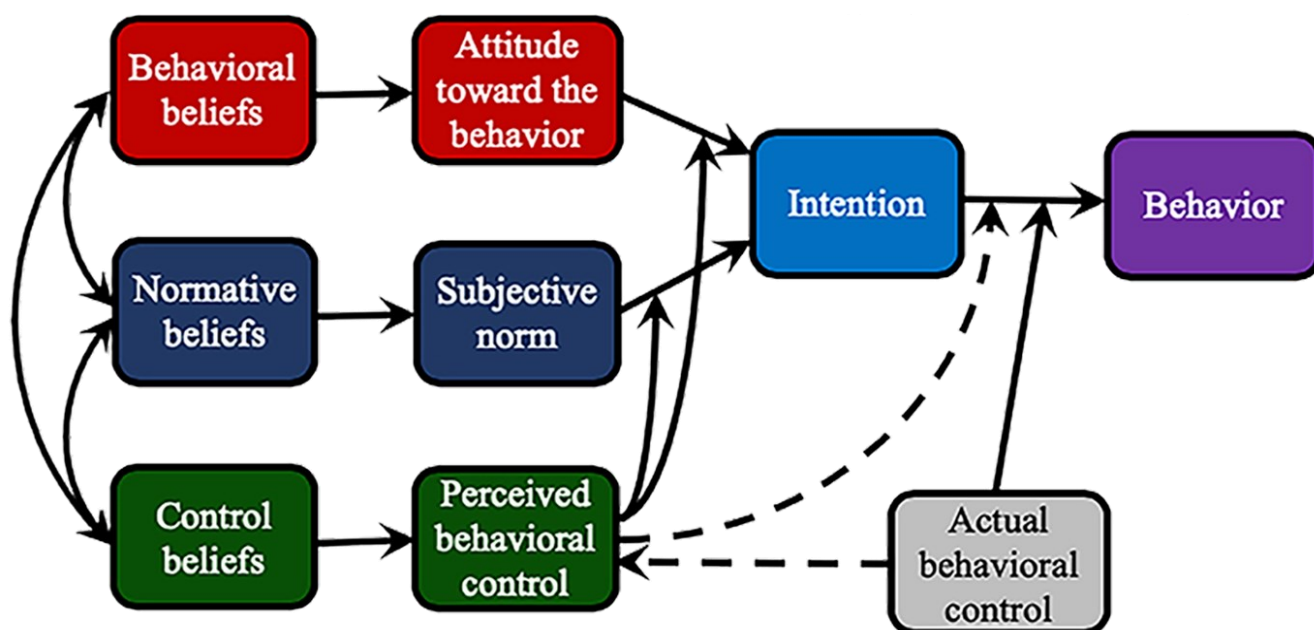


Figure 4 – The Theory of Planned Behaviour (Ajzen, 1991)

Behavioural intention is comprised of three sets of factors: (1) attitude toward the behaviour (behavioural beliefs), which is comprised of the individual beliefs about the likelihood and the evaluation of the outcome of the behaviour; (2) perceived social pressure (also known as the subjective norms) to partake in the behaviour. Subjective norms are determined by what relevant social groups think about the behaviour and whether the individual is willing to comply with expectations these groups (normative beliefs). Finally, the perceived behavioural control (3) one has of behaviour is based on beliefs surrounding individual

ability to facilitate or inhibit the behavioural act. The TPB is not without critique, some suggest that additional variables should be added to improve its predictive validity, as well as the additional consideration of personal and moral norms, self-identity, affect and anticipated regret (Albarracin et al., 2005).

Topa and Moriano (2010) conducted a meta-analysis with the aim of testing the relationship between the factors of behavioural intention and smoking behaviour. It was concluded that perceived behavioural control was the best predictor of smoking-related decisions, followed by subjective norms and then attitude. Therefore, when attempting to cease or reduce smoking behaviour, individuals should aim to strengthen their perceived behavioural control, as it has demonstrated to be a powerful tool on personal behaviour modification (Maher and Rickwood, 1998).

The TPB proposes that attitude development is influenced by personality (Ajzen, 1991). Impulsive personality traits are known to be present in early life (Zapolski et al., 2010), before the development of attitude. It could therefore be suggested that attitude and impulsivity precede EC initiation (Andrews et al., 2016). Impulsivity is multi-dimensional, composed of five distinct but overlapping traits. These traits map on to three underlying factors which are illustrated below in Table 3. The traits of impulsivity have demonstrated in previous research to have differentiating relationships with smoking behaviours, with urgency being strongest predictor of CTC use when compared to the other traits (Lee et al., 2015).

Table 3

Traits of Impulsivity

Trait	Description
Urgency	
Negative urgency	Acting impulsively from a negative effect
Positive urgency	Acting impulsively from positive effect
Deficits on conscientiousness	
Lack of perseverance	Difficulties finishing tasks
Lack of premeditation	Not thinking actions through
Sensation seeking	Seeking new and exciting experiences

Hershberger et al. (2017) extended the TPB to include traits of impulsivity in an attempt to understand how personality traits and attitudes can influence decisions about ECs, in an attempt to develop a framework for understanding initial EC use. Findings demonstrated that the urgency trait is exclusively related to EC attitudes and is likely to be related to EC use. This is possibly because high-urgency individuals are more likely to engage in risky behaviours.

Additionally, those with larger deficits in conscientiousness report more negative attitudes toward EC use. Unlike previous research (Cohn et al., 2015), no significant relationship was observed between the sensation seeking trait and EC use. Alternative research has also demonstrated that trait impulsivity differentiated EC users from CTC smokers and dual users (Kale et al., 2020). In regard to EC behaviours and the TPB, more research is required.

2.3.10.3 Health Belief Model (HBM)

The Health Belief Model (HBM: Rosentock, 1974) is a conceptual framework applied to a variety of health behaviors. It is used to evaluate and explain individual differences in preventative health behaviour (Glanz et al., 2009) and evaluate adherence to health advice (Jones et al., 2013). It aims to explain individual willingness to engage in a particular health-protective behaviour with a desire to avoid illness. The model consists of 6 constructs that predict health related behaviour; (1) risk susceptibility; (2) risk severity; (3) benefits to action; (4) barriers to action; (5) self-efficacy; and (6) cues to action (Rosenstock, 1974; Champion and Skinner, 2008).

The HBM is a value-expectancy model which essentially proposes that perceived risks impact future motivation to engage in health-related behaviours (Pepper et al., 2015). The HBM has been criticised on the basis that it does not account for behaviours that are performed for non-health related reasons such as for social acceptability, emotion (Abbatangelo-Gray et al., 2007), culture (Dutta and Basu, 2011) and general personality differences (McCrae and Terracciano, 2005).

The model suggests that the extent to which ECs and related products are perceived as a less harmful way of consuming nicotine when compared to CTCs will essentially affect the

prevalence of their use. As it is known that smoking cessation and reducing CTC consumption for harm reduction purposes is the most common goal-oriented reasons for EC use, it can be suggested based on the HBM that users are explicitly or implicitly trying to reduce their chances of developing a smoking-related illness. The termination of ECs, following an attempt to reduce or quit CTC smoking is often because ECs did not successively contribute to achieving eventual cessation or reduction, or because of negative experiences such as bad taste (Pepper et al., 2014).

The model provides an insight into the individual perceptions and modifying factors that influence decision-making around ECs (Orellana-Barrios et al., 2016; Smith et al., 2016). The key perceptions that impact the health beliefs and motivating behavioural changes linked to EC and tobacco consumption are illustrated below in Table 2 (taken from Smith et al., 2016). Cues to action and self-efficacy varied drastically between individuals and are therefore not included in the table (Jones et al., 2013; Lein et al., 2016).

Table 4

*Influencing Perceptions on Health Beliefs and Motivating Behaviour Changes
Associated with EC use and Tobacco Consumption (Smith et al., 2016)*

HBM Construct	Perceptions of ECs and tobacco associated with behavioural changes
Susceptibility	Risk posed from the liquid and metal components Risk posed to bystanders such as family or friends from second-hand vapour, fires, device explosions Advertisement attracting non-smokers and youths through social media
Severity	Known links between smoking and serious illnesses Accidental nicotine ingestion by children Lung damage as a result of inhaled toxins Brain injuries, damage to eyes, teeth, skin resulting from explosions
Benefits	Understood as a less harmful alternative to smoking Better smell
Barriers	Smoking ECs perceived as a desirable adjunct in smoking cessation Misunderstandings about how to use and general safety

2.3.10.4 The Transtheoretical Model of Behaviour Change (TTM)

The TTM is an integral and biosocial model that conceptualises the process of behavioural change (Prochaska and DiClemente, 1984). A central aspect of the theory is the stages of

change, which are the stages people move through when modifying their behaviour. These stages are: precontemplation, contemplation, determination, action, relapse and maintenance. The TTM is illustrated below in Figure 5.

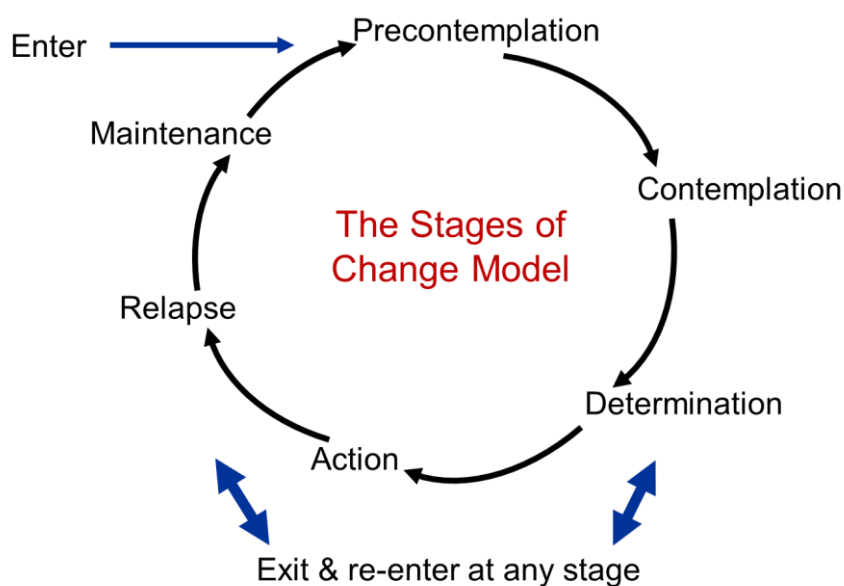


Figure 5 - The Transtheoretical Model of Behaviour Change

The time an individual can spend in each stage varies, but there are some collective principles at each stage that prevent relapse and accelerate progress, these are: decisional balance, self-efficacy and process of change. Decisional balance is comprised of the pros and cons of a given behaviour, the balance between these two constructs can fluctuate through each stage of the model. Self-efficacy is grounded in Bandura's (1977a) self-efficacy theory, which reflects individual confidence in ability to carry out behavioural change. Process of change elucidates the changes on cognition, emotion and behaviour. These are summarised on ten covert and overt processes which are required to be implemented effectively in order for the desired change, the processes are divided in to cognitive and affective experiential processes and behavioural process. This theory has also been criticised on the basis that it ignores the social context in which change occurs. Additionally, some have argued that the lines between the stages of change are arbitrary and need further specification of how different processes relate to the stages of change (Bridle et al., 2005). Koyun and Eroğlu (2013) applied the transtheoretical constructs to smoking cessation, these are illustrated below in Table 5.

Table 5

The Transtheoretical Constructs for Smoking Cessation Koyun and Eroğlu (2013)

Constructs	Description
Stages of change	
Precontemplation	No intention of acting in the next 6 months
Contemplation	Intention to act in next 6 months
Preparation	Intention to act in the next 30 days
Action	Change behaviour for 6 months
Maintenance	Behaviour change has lasted longer than 6 months
Decisional balance	
Pros	The benefits/positives of change
Cons	The costs/limitations of change
Self-Efficacy	Confidence in ability to maintain cessation in varied situations
Process of Change	
Cognitive and Affective	
Experiential Processes	
Consciousness raising	Expanding knowledge to supports cessation
Dramatic relief	Negative emotions about the risks of smoking (worry, fear, anxiety)
Self-re-evaluation	Smoking cessation becomes important part of self-identity
Environmental re-evaluation	Recognising the negative consequences of smoking and the positive impact of cessation in proximal environment
Behavioural Processes	
Self-liberation	Firm commitment to change
Helping relationships	Seeking and using social support to facilitate smoking cessation
Counter conditioning	Replacing unhealthy behaviour with healthy behaviour
Reinforcement management	Rewards for cessation increase as rewards for smoking decrease

Stimulus control	Reminders to engage in smoking are removed
Social liberation	Realising that social norms changing to support cessation

The TTM combined with recognised understandings about smoking relapse suggests that typically individuals smoke on the journey to permanent quitting, fluctuating between quitting and smoking. Therefore, it could be proposed that dual use of ECs and regular CTCs smoking, could potentially act as a long-term pathway to permanent quitting. Among adults, dual use can provide an innovation tool where in previous attempts they would have relapsed (dual use is explored further in Section 2.2.15). Therefore, maintaining the reduction of CTC consumption as well as allowing them to reduce the symptoms of nicotine withdrawal (Gökbayrak et al., 2015). Additional extensive research is required when attempting the implement EC use and behaviour with the TTM.

2.3.11 General Health and Safety Concerns

There are concerns over the general safety of the content of ECs. Concerns have arisen regarding negative reported health effects including mouth and throat irritations, dry cough, dizziness (Soule et al., 2016) as well as the recent outbreak of Vaping Use-Associated Lung Injury (EVALI). Alternative concerns stem from respiratory irritations following the inhalation of the components found in the device (WHO, 2014). Some research has demonstrated that there may be a possibility that the inhaled vapour from the EC could be polluted with the metals and plastics that make up the device (Williams et al., 2013). Varying nicotine concentrations may also pose a risk of toxicity due to accidental ingestion, inhalation, and dermal and ocular exposure (Callahan-Lyon, 2014). Other concerns include potential hazards due to leaked cartridges; nicotine intoxication; fatal poisoning and the issue of disposal (Shawn and Nelson, 2013; Gupta et al., 2014; Hua et al., 2016).

Conflicting evidence proposes that the risk of accidental poisoning from an EC is only as likely as general household cleaning products (Wagener et al., 2012). Research also suggest that the carcinogenic compounds found in ECs are significantly lower than those found in CTCs (Goniewicz et al., 2013; Cancer Research UK, 2020). Moreover, no detectable lung changes were found among never smokers who had regularly vaped for the past four years (Polosa et al., 2017). There is also no evidence suggesting that short-term

EC use has any adverse effects on haematological or cardiovascular function in smokers and ex-smokers (Flouris et al., 2012).

It is important to emphasise that EC devices are not homogenous, some claim that research tends to ignore the differences between different products (Thirlway 2015). Although the risks are smaller than the risks from tobacco, there is still not enough research to be able to accurately quantify them. Therefore, it is difficult to make conclusive statements about the safety of ECs as the level of toxins in individual devices can fluctuate (Brown and Cheng, 2014 Leigh et al., 2016). Furthermore, nicotine levels also vary across e-liquids, and some research has even found that the level of nicotine claimed on the labels, differed significantly from the actual measured value (Gonewiwcz et al., 2013; Chen et al., 2015). Due to these methodological issues, limited number of available studies, conflicts of interest, lack of long-term follow up research and the inconsistencies and contradictions in the research that is available, some researchers believe that no firm conclusions can be draw at present (Pisinger and Døssing, 2014).

When discussing general health and safety concerns, it is also important to consider the recent EC or Vaping use-Associated Lung Injury (EVALI) (originally known as Vaping Associated Pulmonary Illness [VAPI]) outbreak, recognised by the US Centre for Disease Control and Prevention (CDC) in August 2019. EVALI is a severe lung illness in otherwise healthy individuals which is related to using EC and vaping products (Siegal et al., 2019). Most patients (95%) presented with respiratory symptoms of cough, chest pain, and shortness of breath (Siegal et al., 2019). Research suggests that Vitamin E acetate, most commonly used as an additive in Tetrahydrocannabinol (THC) (Boudi et al., 2019) is one of the main causes of EVALI. It has been found in the bronchoalveolar fluid of patients with EVALI, but not in healthy control participants (Blout et al., 2020).

The epidemic appears to be limited to the US, as there are significantly fewer reported cases and no deaths from the rest of the world (Salzman et al., 2019). This may be because the UK has placed restrictions on the import of selected vaping products, limiting the amount of nicotine, and has also placed restrictions on the advertising of ECs (Advertising Standards Agency, 2020). This also suggests that THC is not being used in the UK. The EVALI outbreak in the US has resulted in UK individuals perceiving ECs as more

harmful (Tattan-Birch et al., 2020). Generally, research demonstrates that the EVALI outbreak is changing public perceptions of ECs (Patel et al., 2020).

When all is considered based on the standard number of toxins produced during unalloyed EC use, made with the usual ingredients, there is an indication that ECs are less toxic than CTCs and have similar levels of toxicity to alternative forms of NRTs (PHE, 2019). From the available evidence, health organisational bodies, including PHE and the RCP, claim that ECs are 95% less harmful than CTCs (RCP, 2016; PHE, 2019). Equally, it is important to point out that some contest these figures. There are claims that although there is a strong consensus that ECs produce fewer toxins than CTCs, it is still impossible to say precisely how dangerous they are (Glantz, 2015). Research suggests that if ECs were more than 10% as dangerous as CTCs, then there would be no net public health gains (Kalkhoran and Glantz, 2016). More recently, Eissenberg et al. (2020) stated that the 95% safer is a “factoid”. This stems from claims that these figures are not evidence based and are from UK organisations that are pro ECs. Further complicating the EC situation is: (1) the vociferous leaders on opposite sides of EC dispute who encourage an in-group/out-group mentality; (2) Big Tobacco’s recent involvement with the EC market, and their untrustworthy history of THR products and marketing strategies; (3) the fluctuating market of EC designs and (4) Britain leaving the EU meaning there is potential for changes in regulation and guidelines.

The number of smokers who believe that vaping is less harmful than smoking has recently fallen from 48% to 39% (ASH, 2020). This may be linked to EVALI outbreak, as previously discussed (Tattan-Birch et al., 2020), although the data on perceptions of risk have been declining for the past few years (ASH, 2020). When considering the contradictory evidence, it is understandable where perceptions may fluctuate. This assumption is supported by qualitative explorations of EC perceptions, as generally, there is evidence of uncertainty and misunderstanding regarding the information available surrounding ECs (Rooke et al., 2016; Sherratt et al., 2016; Vasconcelos and Gilbert, 2018).

2.3.12 Second-hand Vapour (SHV)

Concerns have arisen in relation to the effect on bystanders of active and passive exposure of SHV. Some research has demonstrated that ECs are not emission-free, and their contaminants could impact bystanders (Schober et al., 2014). Research has demonstrated

that 30-minute passive exposure EC emissions can cause immediate alterations in respiratory mechanics (Tzortzti et al., 2018). The tobacco industry claims that EC aerosol is 99.9% water and contains negligible amounts of hazardous chemicals (Long, 2014). Studies by tobacco industry researchers (Tayyarah and Long, 2014) and non-industry researchers (Saffari et al., 2014) conclude that aerosols contain significantly less toxins than second-hand smoke from CTCs (McAuley et al., 2012; Ballbè et al., 2014; Czogala et al., 2014; Hess et al., 2016). Harm to bystanders as well as users from SHV is likely to be much lower than second-hand smoke from CTCs. However, it is important for longitudinal research to determine any long-term consequences of the inhalation of SHV. Perceived harms of SHV have been shown to be positively associated with supporting public vaping restrictions (Mello et al., 2015).

2.3.13 ECs and Nicotine Addiction

ECs are recognised as a less harmful method of consuming nicotine when compared to CTCs, as the nicotine is consumed in a vapour rather than smoke (Polosa et al., 2017). Although variations in device characteristics can alter nicotine concentrations, it is generally understood that an increase in EC power and e-liquid will increase nicotine yield. As previously discussed, nicotine is the addictive substance in tobacco, which is why it is commonly accepted that nicotine delivery via ECs pose little danger to adults (Cancer Research UK, 2020b).

As previously discussed in Section 2.3.2, NRTs have often been criticised as they cannot accurately mimic the speed of nicotine delivery, as well as the embodied hand-to-mouth movements in a CTC (Cox and Jakes, 2017). As ECs are capable of addressing these specific behavioural aspects, even non-nicotine containing ECs can suppress some aspects of the withdrawal symptoms (Bullen et al., 2010; Etter and Bullen, 2011; Dawkins et al., 2012; Wagener et al., 2012; Caponnetto et al., 2013; Cox and Jakes, 2017). Research has demonstrated that there is a reduction in the symptoms of nicotine dependence when comparing smokers to vapers (Vansickel and Eissenberg, 2012; Foulds, 2015), and time waking up before the first use was significantly shorter in smokers than in vapers (Dawkins et al., 2013). A large proportion of EC users rate their nicotine dependence as significantly weaker when compared with their CTC dependence (Dawkins et al., 2013). Yet, Etter and Eissenberg (2015) claim that those who vape with nicotine containing e-liquid rate their nicotine dependence as higher and are less likely to have the intention to eventually stop

using their EC. This is concerning, as research found only 1% of current vapers employ a zero-concentration nicotine e-liquid (Dawkins et al., 2013).

Some randomised control trials (RCTs) have demonstrated favourable outcomes toward quit rates among users of e-liquid containing nicotine when compared to non-nicotine liquid (Bullen et al., 2013). Other RCTs have also demonstrated that ECs are more effective for cessation when combined with other NRTs and additional behavioural support (Hajek et al., 2019). A systematic review and meta-analysis exploring RCTs that compared nicotine and non-nicotine containing e-liquids with recognised cessation interventions published between 2014 and 2020, found that nicotine containing e-liquids may be more effective than non-nicotine containing ECs and NRTs in regard to smoking cessation (Grabovac et al., 2020). As important as RCTs are in identifying potential efficacy, it is important to remember that real-world effectiveness depends on a variety of contextual variables (Brown et al., 2014). Additionally, contesting the previously discussed findings from RCTs, a systematic review and a meta-analysis assessing smoking cessation among smokers using ECs compared with those not using ECs demonstrated that ECs are associated with significantly fewer successful quit attempts (Kalkhoran and Glantz, 2016).

Online cross-sectional cohort research also supports the role of ECs as an effective method of smoking cessation (Brown et al., 2014). It has been suggested that nicotine containing liquids combined with devices that can have higher-powered settings are more likely to successfully attenuate withdrawal symptoms among smokers (Cox et al., 2016). This is corresponding with research which suggests newer generation EC devices with higher-powered batteries are more successfully at increasing plasma nicotine levels (Vansickel and Eissenberg, 2012; Farsalinos et al., 2014). Therefore, it has been suggested that nicotine containing ECs can assist smokers in quitting when compared to non-nicotine containing ECs (efficacy as a cessation device is explored in Section 2.3.14).

Generally, the public perception of the purpose of less harmful substitutes for addiction (harm reduction strategies) is that they eventually eradicate addiction (Farrimond, 2016), yet it is widely understood that relapse is a common aspect of addiction for many. Therefore, there can be numerous benefits of long-term dependency on less harmful products (Farrimond, 2016). The main concern in this instance is whether ECs will exacerbate nicotine dependency rather than eradicating it. In a narrative review, it was

concluded that the debate of whether vaping perpetuates or attenuates nicotine addiction is dependent on the underlying incentive of whether an individual is motivated to quit or not (Rahman et al., 2015). This is understandable as previously discussed, the TPB (Ajzen, 1991) and the HBM (Rosenstock, 1974), two key influencing models in health behaviour, emphasise the importance of behavioural intention in overall behaviour change.

Bell and Keane (2012: 245) claim that the main controversy surrounding ECs and nicotine addiction stems from the 'ideological challenge they pose to the binary categorisation of nicotine into not only remedial and harmful forms but morally 'good' and 'bad' ones'. Whereby 'good' nicotine refers to nicotine used for medicinal treatment purposes and 'bad' nicotine referring to recreationally used nicotine. For example, NRTs are seen as 'good' nicotine as they are used to stop individuals smoking the 'bad' nicotine in CTCs, in the eventual aim of weaning them off nicotine completely. However, if NRTs are used to shift the addiction rather than eliminating it, it is then viewed as 'bad' nicotine. ECs were initially brought into the public health view as part of the procedure of THR and were categorised solely for this purpose, branded as a 'cure' or 'remedy' to nicotine addiction (good nicotine). ECs were seen as 'clean' and 'safe' forms of nicotine when compared to the 'unsafe' and 'deviant' nicotine seen in a CTC. Although, the recreational use of ECs has blurred these boundaries (Bell and Keane, 2012).

The most frequently documented beneficial effects of switching from CTCs to ECs are reduced shortness of breath, cough, spitting, and sore throat (PHE, 2019). Other reported beneficial effects of switching include decreased weight gain after enhanced exercise tolerance (PHE, 2019). However, it is important to emphasise they cannot be considered harmless entirely, adverse health consequences of use has been discussed in Section 2.3.11.

The appropriateness of endorsing EC devices as a safer way to consume nicotine as part of the harm reduction approach has created a quandary (Cahn and Siegel, 2011; The Lancet, 2013; Bialous and Sarma, 2014; Bullen et al., 2014; Pepper et al., 2016). The uncertainty of the long-term safety of ECs has resulted in amplified tension between the harm reduction approach and the abstinence approach to smoking. Unlike the public response to HIV/AIDs, as an example, harm reduction is sometimes discouraged from tobacco control (Stimson, 2016). This is because previous harm reduction tobacco-related

products, such as 'light' CTCs turned out to be just as harmful as CTCs (Berridge, 2014). Moreover, the glamorisation of certain brands mirrors that of earlier CTC advertisements before the full extent of their risk was known. As a result, for some, the abstinence model has become more acceptable than the harm reduction prospects for tobacco (Farrimond, 2016).

The evidence that is currently available (RCP, 2016; PHE, 2019; Cancer Research UK, 2020) generally supports the cautionary implementation of harm reduction strategies that aim to promote ECs, endorsing them as attractive alternatives to CTC smoking whilst also ensuring appropriate measures are implemented to protect vulnerable groups. A paradigm reconciling liberalism and utilitarianism can appropriately summarise the impact of displacing a high-risk activity (such as smoking CTC) with a lower-risk activity (such as using an EC), this is also known as the risk/use equilibrium (Kozlowski, 2001). This paradigm suggests that if (as an example) ECs reduce a smoker's risk of illness by 99%, for every smoker switching to ECs, 100 non-smokers would have to start using ECs in order to attain no net benefits in regard to public health (Kozlowski, 2001). As it has been stated, ECs are estimated to be 95% less harmful than CTCs (RCP, 2016, PHE, 2019), therefore 20% of non-smokers would need to initiate EC use to disrupt any benefits of smokers who are switching to ECs. Accordingly, it can be assumed that it is unlikely that EC will result in significant public health harms, regardless of the inevitable uptake of the devices by a small number of non-smoker population. By using this framework, nuance is provided to the absolutist notion that the uptake of ECs by non-smokers will experience significant adverse effects on the general health of the population. This means it is unlikely that EC uptake among non-smokers will overshadow the public health gains (Franck, 2016).

2.3.14 EC as a Smoking Cessation Device

The English stop smoking services (SSS) are almost unique internationally as they are free at point of use (Farrimond and Abraham, 2018). Recently, SSS funding has been cut by 50%, and a quarter of local authorities in the UK no longer commission specialist SSS (National Institute for Health and Care Excellence, 2019). Yet, smoking cessation remains an urgent priority (WHO, 2020).

In regard to ECs and smoking cessation, there are two key issues to discuss; (1) whether EC users are doing so to quit smoking and (2) whether they are effective. Some research

has demonstrated that ECs are associated with significantly fewer quitting rates among smokers (Kalkhoran et al., 2015). A pragmatic trial exploring whether financial incentives, pharmacological therapies and ECs can promote smoking cessation found that the ECs did not increase cessation rates (Halpern et al., 2018). A meta-analysis of ECs as cessation devices which included a range of studies found that there is little evidence that ECs may help people quit, and some claim they actually undermine the attempts to do so (Kalkhoran and Glantz, 2016). Although it is of relevance that a large proportion of the studies analysed in the meta-analysis excluded those who had already managed to quit using an EC, and the study did not examine the efficiency of interventions.

Alternatively, research has found that ECs help between 50,000 and 70,000 people quit smoking every year in England, and changes in prevalence of EC use, have been positively associated with the overall successful quit rates (Beard et al., 2019). When comparing ECs to nicotine inhalers, it has been found that ECs are generally perceived as more satisfying (Bullen et al., 2010), and most users would prefer to use them in a quit attempt over an inhaler (Stienberg et al., 2014). In a population-based survey in England, smokers expressed they were more likely to quit in their last quit attempt if they were using an EC in comparison to over the counter NRTs, this persists after adjusting for a variety of smoker characteristics such as nicotine dependence (Brown et al., 2014). It has also been suggested that ECs can embolden those with no original intentions to quit, to want to quit (PHE, 2019). Research investigating the efficacy of ECs as a smoking cessation device, or as a tool to cut down the number of CTCs smoked, has demonstrated that they are effective at doing so (Etter and Bullen, 2011; Bullen et al., 2013; Dawkins et al., 2013; Rahman et al., 2015; Hartmann-Boyce, 2018). Although this research is available, there is still significantly less evidence when compared to the abundance of research exploring the efficacy of NRTs.

PHE (2019) suggest that the limited explorations that exist are promising. It is estimated that around 2.5% of smokers that were using an EC in an attempt to quit smoking were successful, whereas they would have failed if they were to have used other forms of quitting support (West et al., 2016). Data from the Eurobarometer stated that 35.1% of current EC users claimed to have quit smoking using an EC. A further 32.2% reported to have at least reduced CTC consumption. By extrapolating these data, it can be estimated that around 6

million smokers in Europe have quit smoking as a result of ECs, and a further 9 million have reduced their intake (Zhu et al., 2017).

2.3.15 Dual Use

Whilst there is no clear consensus on definition (Maglia et al., 2017), dual use generally refers to vapers who also smoke (ASH, 2020). The percentage of dual users in the UK has recently declined to 38.3% (ASH, 2020). Research has demonstrated that the decision to use an EC or smoke a CTC for dual users is dependent on the contextual setting (i.e., in the UK smoking is banned indoors and in some outdoor spaces); circumstances (i.e., CTCs being used when ECs are unavailable); and individual cravings (Dawkins et al., 2013; Dockrell et al., 2013; Pokhrel et al., 2015). Maglia et al. (2017) found in a systematic review exploring 76 articles that the purpose of ECs for the majority dual users was predominantly eventual smoking cessation, smoking reduction and the reduction of negative health effects. Dual users are more likely to use CTCs in hedonistic or anxiety provoking situations and that these types of circumstances are likely to deter users from giving up CTCs (Maglia et al., 2017; Vandrevella et al., 2017).

Most dual users' intentions are to reduce CTC smoking using an EC (ASH, 2020).

Concerns about dual use arise when ECs are used as complementary products rather than a substitute. Using ECs as a complement rather than a substitute could potentially dampen any benefits of using an EC as a cessation device. This could make some smokers worse off as they can prolong smoking CTCs and potentially increase their nicotine dependence. If ECs are adopted as substitutes, the rate of health and financial benefits could increase, as well as the rate of cessation for smokers. Although, if they were to act as complements, they may prolong the use of CTCs (Kalkhoran et al., 2015).

Although ECs can prevent nicotine withdrawal as well as effectively mimic as the ritualistic and sensorimotor aspects of smoking, many smokers still claim they are not as satisfying as CTCs (Pepper et al., 2014). It is important to point out that this may differ because devices vary noticeably with the level of nicotine they deliver (Farsalinos et al., 2014). When assessing the number of dual users and the evident lack of satisfaction from users, it has been suggested that product development combined with the sale of higher nicotine

concentrated e-liquid would be a suitable recommendation for smokers to fully transition to EC (Farsalinos et al., 2015).

Research also suggests that smokers attempting to quit using an EC often relapse back to CTCs, yet continue to use an EC (Notley et al., 2018). Overall, this still results in significant decrease in tobacco consumption, leading to the conclusion that dual use of ECs and CTCs use can still promote subsequent quit attempts (Bullen et al., 2016). Elements of the previously discussed TTM could be reflected on here, dual use can therefore facilitate the journey to permanent quitting, providing a method of avoiding the symptoms of nicotine withdrawal (Gökbayrak et al., 2015). Additionally, adolescents attempting to quit smoking were more likely to use ECs in their quit attempt, but less likely to abstain from smoking entirely. This suggests that although ECs may not always result in a successful quit attempt, they can reduce harm by reducing the total number of CTCs smoked (Lee et al., 2015).

Whether dual use attenuates or perpetuates nicotine addiction remains a topic of debate. By limiting EC discussions with patients who are struggling to quit smoking using standard treatments such as NRTs, clinicians and other health personnel may reap inadvertent consequences. Such as the perpetuation of chronic smoking among those who would otherwise find quitting unattainable (Maglia et al., 2017). The dual use of ECs and CTCs has evidenced that it can still reduce harm in those who continue to smoke but reduce the number of CTCs per day, by demonstrating improvements in respiratory functions (Rahmen et al., 2014; Polosa et al., 2016).

2.3.16 Gateway to Conventional Cigarette Use

The gateway theory was developed in the 1970s as explanation for the witnessed pattern of illicit and licit drug use (Bell and Keane, 2012). The key notion is that 'softer' forms of drug use will ultimately lead to 'harder' forms of drug use (Bell and Keane, 2012). When it first emerged, it was specifically used to support the notion that marijuana use would lead to heroin use (Anthony, 2012). The theory has been applied to the use of ECs. The concern is that EC use may lead to eventual CTC smoking, particularly in younger people (Leventhal et al., 2015; Etter, 2017; Farsalinos, 2018). Although contested, the idea behind the theory is that ECs will act as a 'starter product' (Henningfield and Zaatari, 2010; Pearson et al., 2012), delivering low levels of nicotine to non-tobacco users, which develops into an

addiction, leaving users to eventually turn to CTCs to avoid symptoms of withdrawal (Henningfield and Zaatari, 2010). Other concerns stem from the potential of developmental harms from nicotine exposure (England et al., 2015) and potential renormalisation which is explored further in Section 2.3.17.

Fulton et al. (2018) found in a UK study with 499 school students aged between 11-16, that young people who may have never experimented with tobacco but would consider using an EC could be at risk of tobacco use later in life. Under 40% of the students were aware that in most cases ECs contain the addictive substance nicotine. It was stated that young people recognise the reduced harm to health but not the associated risks, and EC use among this population is related more with experimentation and easier access, rather than smoking cessation attempts. Additionally, in a Scottish cohort study it was found that young never-smokers are more likely to experiment with CTCs later in life if they have tried ECs, although causality was not inferred (Best et al., 2017). A qualitative study suggests that young people themselves also believe that ECs act as a gateway to smoking later in life (Akre and Suris, 2017).

Some studies exploring the gateway effect often come to similar conclusions as the previously discussed study, leaving stern warnings in regard to the risk of ECs leading to smoking and concluding that inevitably: awareness leads to experimentation, which creates a nicotine dependency and eventual regular smoking behaviours (Corey et al., 2013; Pepper et al., 2013 Fulton et al., 2018). However, none of these studies explicably examined EC use and CTC use in a longitudinal fashion and alternative research also refutes these claims. Representative surveys of UK teenagers found that whilst it is common for young people to experiment with ECs, and this number is on the increase, only a small number of young smokers use these products regularly (Moore et al., 2015; Bauld et al., 2017). Evidence from a 12-month prospective study using a cross-sectional survey which assessed whether adolescent EC use was associated with prospective initiation and/or escalation of CTC use, found that ever use of ECs was strongly associated with initiation, but modestly related to escalation of CTC use (Conner et al., 2017). Alternative research refutes these claims suggesting that a true gateway effect has not yet been found (Lee et al., 2019).

Research attempting to show a gateway effect have been criticised for failing to differentiate between experimental vaping and regular use when assessing eventual CTC smoking. They also fail to take into account the pre-existing tendencies of individuals. It is important to emphasise that gateway theory is a predictive model, rather than an empirically driven theory. It is a predictive of what will/could happen, rather than a detailed and recognised pattern of drug use (Bell and Keane, 2012). It has been suggested that that the gateway theory is opposes prevalence trends in the UK such as declines in smoking rates (ASH, 2020). It is also important to note that smoking activities among the youth were apparent before the introduction of ECs (Centres for Disease Control and Prevention, 2018). Additionally, rates of EC use are higher among ex-smokers and smokers than youths (ASH, 2020). It appears that additional research with longer follow-ups and a broader age range is required to further assess the gateway effect.

2.3.17 Denormalisation and Renormalisation

Another aspect of the precautionary attitude toward ECs, stems from the renormalisation argument, which poses that ECs reduce the incentive to quit smoking. This is due to their ability to mirror some smoking cues, such as the hand-to-mouth movements and other rituals associated with the behaviour, which arguably renormalises smoking. This is presented as a problem as it is in direct opposition to denormalisation policies, which aim to reduce tobacco consumption by attempting to make tobacco products and associated behaviour 'invisible' (Hammond et al., 2006). The concern that EC use will renormalise smoking stems from the semiotic similarities between ECs and CTCs in their aesthetics and how they are used, especially among children who may struggle more to see a difference (Vogit, 2015; Moore et al., 2015; Best et al., 2018). The renormalisation argument therefore makes a case that ECs should be banned where CTCs are also banned.

The renormalisation drive emphasises concern of the similarities between EC use and CTC smoking, although these similarities vary on the specific type of EC. It is true that some ECs can closely mimic a CTC (first generation devices), although this is not true for all ECs, as they can vary in their appearance. Additionally, first generation devices are largely obsolete now. Moreover, research exploring Welsh primary school children's (age 7-11) awareness of ECs relative to smoking found that primary school children can differentiate between ECs and CTCs (Porcellato et al., 2020).

If the notion that ECs should be banned in public spaces because of their similarity to CTCs, and the concerns that they challenge to anti-smoking norms, then it would be logical that this ban would only apply to ECs that are visually similar to CTCs when used.

Although, some scholars suggest that it could be seen as problematic to suggest an activity should be restricted simply because it looks like another restricted activity (Vogit, 2015). Still, some like Public Health Wales have argued for a ban in public spaces frequented by children (e.g., parks / outside schools etc) based on social modelling and normalisation concepts such as the visibility of vaping by influential adults (e.g., parents and teachers) may normalise the behaviour and lead to future vaping (Bandura, 1977a; Hilton et al., 2016).

Roditis and Halpern-Felsher (2015) claim the controversial information regarding ECs can often result in individuals turning to their embodied knowledge of CTCs to understand and develop personal understandings of ECs (Lucherini et al., 2018). This can be an issue as most individuals internalise a disapproval of smoking due to denormalisation. Individuals can extend these norms to EC use because of the similar performative activities involved in both the embodied and spatial practice. This can be problematic, as some smokers may not seek help due to concerns about associated stigma (Kim and Shanahan, 2003; Stuber et al., 2009; Riley et al., 2017). The conceptual similarities between the aims of denormalisation and the outcomes of stigmatisation in regard to smoking are undeniable (Bayer, 2008; Bell et al., 2010).

Tamimi (2017) found in a study exploring EC users and stop smoking advisor's perceptions of ECs that participants were divided in their views on whether ECs renormalise smoking. SSS advisors favoured a ban of the use of ECs in public spaces, whereas users voiced their 'right to vape', but this is only if it can be concluded that they are harmless to others. ECs renormalising smoking behaviour is an area of concern, but this issue remains unsupported by current evidence (Bullen et al., 2016; Brown et al., 2020; Hallingberg et al., 2020).

2.3.18 ECs, Stigmatisation and the Identity of an Addict

ECs present a complex issue for individuals in terms of their self-identity (addict or non-addict) and moral reasoning (Thirlway, 2016). General attitudes toward ECs should be understood as a matter of identity as well as a political stance. How group memberships and social identity affect health and general well-being is becoming a growing area of

interest (Jetten et al., 2017). Previous research demonstrates that there is stigma attached to smoker identities, which is associated with negative connotations such as poverty and pollution (Farrimond, 2006; Bell et al., 2010; Graham 2012). The stigmatisation of smokers was influenced by the previously discussed denormalisation of tobacco use policies (Bell et al., 2010). As the specific temporal actions of ECs still somewhat mimic CTCs, EC users are still required in some ways to negotiate the negative aspect of a smoker identity on a political and personal level (Thirlway, 2016). Bell and Keane (2012: 245) provide light on this, claiming that 'the mimicry of smoking from the production of exhaled vapour is an unmistakeable signifier of smoking and therefore invokes both the memory of the public smoking culture and its possible resurgence'. Therefore, due to these somatic similarities, the general condemnation of CTCs can easily transfer to ECs, with little focus on their differences (Keane et al., 2017).

As previously discussed, some claim vaping is a practice in its own right and society should move away from viewing ECs as solely smoking cessation devices (Pokhrel et al., 2015; Vogit, 2015), allowing smokers a way of escaping this stigmatisation. ECs should be reframed as not only a temporary substitute, but an opportunity to form new habits with unique rituals and culture (Tamimi, 2018). Transitioning to ECs from CTCs can create new types of identities by redefining the old ones (Clarke et al., 2003). Those who vape, and its other defendants are quick to stress the malignant physical, social and psychological differences between ECs and CTCs. In qualitative exploration one participant stated, 'smoking is evil, vaping is not' (Keane et al., 2017). The appeal of modular vaporisers (third generation mod devices) could be contributed to their evident physical and material differences from CTCs which reinforces symbolic opposition of meanings. This could be an attempt by users to separate themselves from the identity of the 'smoker' and move toward attaining the identity of a 'vaper'.

Identity becomes complex when considering the position of a dual user (Vandrevala et al., 2017). How and where they view themselves (smoker vs. non-smoker) is dependent on their personal conceptualisation of EC use and where they place themselves in relation to CTC smokers and EC users, as well as their personal evaluations of their dependency. Most dual users aligned their identity as a vaper (Vandrevala et al., 2017), this may be a result of the pariah status associated with smokers (Gough et al., 2009). This is hard to sustain credibly as the consumption of CTCs potentially undermines this identity in the eyes

of peers, whose identity is absorbed in exclusivity with only smokers or vapers (Notley et al., 2018). This places dual users liminal identity position, as they smoke in some contexts but vape in others. A pertaining question that also arises when considering the identity of the dual user is of their intentions of dual use, this has been discussed in Section 2.2.15. It also brings in to question the identity of non-smokers who initiate EC use (referred to as the emerging demographic) how they would choose to define themselves (vaper vs. non-vaper / addict vs. non-addict).

One study which focused on identity as a central characteristic of EC use among youths, found that the projection of a personal image of being 'cool' was influential in decision-marking (Hughes et al., 2014). This conflicts with alternative research which suggests that adult vapers favour the social element of ECs (Barbeau et al., 2013). One study with vapers at an EC conference, found participants were engrossed within the culture of vaping and the language associated, as well as a keen interest in topical research and policy issues (McQueen et al., 2011).

2.3.19 Summary of Literature Review

A significant amount has changed and continues to change since the introduction of ECs in 2007 in the UK. ECs are complex, there are an abundance of brands, flavours, models, inconsistent regulations, and there is also the notion that they are relatively novel products meaning understanding the long-term effects is beyond the bounds of possibility. These issues are also amplified by the contradictory and hyperbolic social, political and media discourses.

Reasons for EC use are well documented and are often related to smoking cessation and reducing CTC consumption for health related reasons (Etter and Bullen, 2011; Dawkins et al., 2013; Sussan et al., 2017; ASH, 2020). Qualitative explorations of EC understanding and behaviour in adult smokers have found a continuum of opinions exist, determined by personal experience and history (Kim et al., 2016; Rooke et al., 2016; Simmons et al., 2016). There is also evidence of uncertainty and misunderstanding regarding the available surrounding ECs (Rooke et al., 2016; Sherratt et al., 2016; Vasconcelos and Gilbert, 2018). Yet, there are still gaps in research relating to what specific factors encourage and deter use in adults with varied smoking/vaping statuses, not just those who are looking to quit smoking. It is important to explore accounts from a diverse range of adults as the idea that

EC science and regulation is driven by public ideologies seems more relevant than ever (Kosmider and Anastasi, 2016) and user perceptions, motivations and behaviour underpin many of the key issues (Sussan et al., 2017). Understanding these accounts will facilitate effective health communications strategies which can educate the public about ECs. Generating this understanding can also guide policymakers on the most effective ways to legislate ECs in terms of the best outcomes for THR. Based upon the synthesis presented in this literature review, the overarching aim of the thesis is to explore EC accounts from a variety of users and non-users, to understand the factors that act as facilitators and barriers. Research aims and individual objectives have been stated in Section 1.3.

2.4 Chapter Summary

This chapter has presented the context and relevant background, by discussing surrounding literature that frames the thesis. It has highlighted the gaps in research, which broadly, is related to understanding adult smoker and non-smoker accounts of ECs. It has then provided a rationale for understanding these gaps, such as using the findings from this thesis to understand the needs and concerns of user and non-users to tailor communication messages and provide guidance for professionals and policymakers.

The following chapter will provide an overview of the epistemological, ontological and philosophical considerations of three exploratory studies that make up this thesis. The chapter will also provide an overview and justification of the methodological decisions made by drawing upon methodological evidence. Finally, the chapter will provide an overview of the practices put in place by the researcher to ensure rigour in the research process. A comprehensive method section will be included in the findings chapters to help contextually frame the specificities of individual studies such as an overview the data collection and data analysis procedures. The findings and discussion for each of the research questions will then be presented.

Chapter III – Research Methodology

3.1 Introduction to Research Methodology

The previous chapter provided a review of the existing literature to contextualise and identify the key research questions of this thesis. This chapter discusses the methodological, epistemological, ontological and ethical considerations of the thesis. The chapter will begin by reiterating the aims of the thesis. The research design and the theoretical assumptions that underpin it will then be discussed. Strategies that have been employed to gather and analyse data in individual research studies will be outlined and justified. The chapter will conclude by discussing ethical considerations and the strategies in place to ensure rigour.

The overall aim of this thesis is to understand the factors that act as facilitators and barriers for EC use in adult smokers and non-smokers. This thesis uses a qualitative approach that can attempt to comprehend influencing factors of EC use and behaviour. This was achieved by conducting three distinct but overlapping research studies which could explore the research question from different standpoints.

The first study (Study One) consisted of an online OeQ to generate initial ideas about smokers' and non-smokers' accounts of ECs using inductive thematic analysis at the latent level (Chapter 4), exploring the research question: 'what are the factors that influence EC behaviour and opinion in adult smokers and non-smokers?'. This contributed to the overarching aims of the thesis as it explored an abundance of broad accounts of ECs, and therefore provided a base of knowledge and understanding for the subsequent studies.

The second study (Study Two) consisted of semi-structured interviews (SSI) to add further insight to the results obtained from Study One using the same form of analysis (inductive thematic analysis at the latent level) (Chapter 5). Study Two explored the question: 'what are the factors that act as facilitators and barriers of EC use in adult smokers and non-smokers?'. This contributed towards the overarching aim of the thesis as it built upon the data from Study One, but generated more in-depth accounts of ECs, by providing a method

that could probe individual experience and provide space to clarify meaning and observe non-verbal behaviour.

The final study (Study Three) utilised a FG methodology (Chapter 6) to understand how language is used to communicate perceptions of ECs by using discourse analysis (DA) informed by discursive perspectives. These methodological decisions allow the focus to be on the talk between speakers, highlighting meaning around the use of ECs, exploring the question: 'how do adult smokers and non-smokers use language to communicate perceptions of ECs?'. This contributed to the overall aim of the thesis, as it provided an insight into the social conceptualisation of ECs, providing an opportunity to observe how social influences affect how ECs accounts are debated and disputed within groups. This was particularly important especially when considering how findings from both Study One and Study Two highlighted the influence of social context on EC perceptions. Figure 6 illustrates a summary diagram of the methodological approaches of the three research studies.

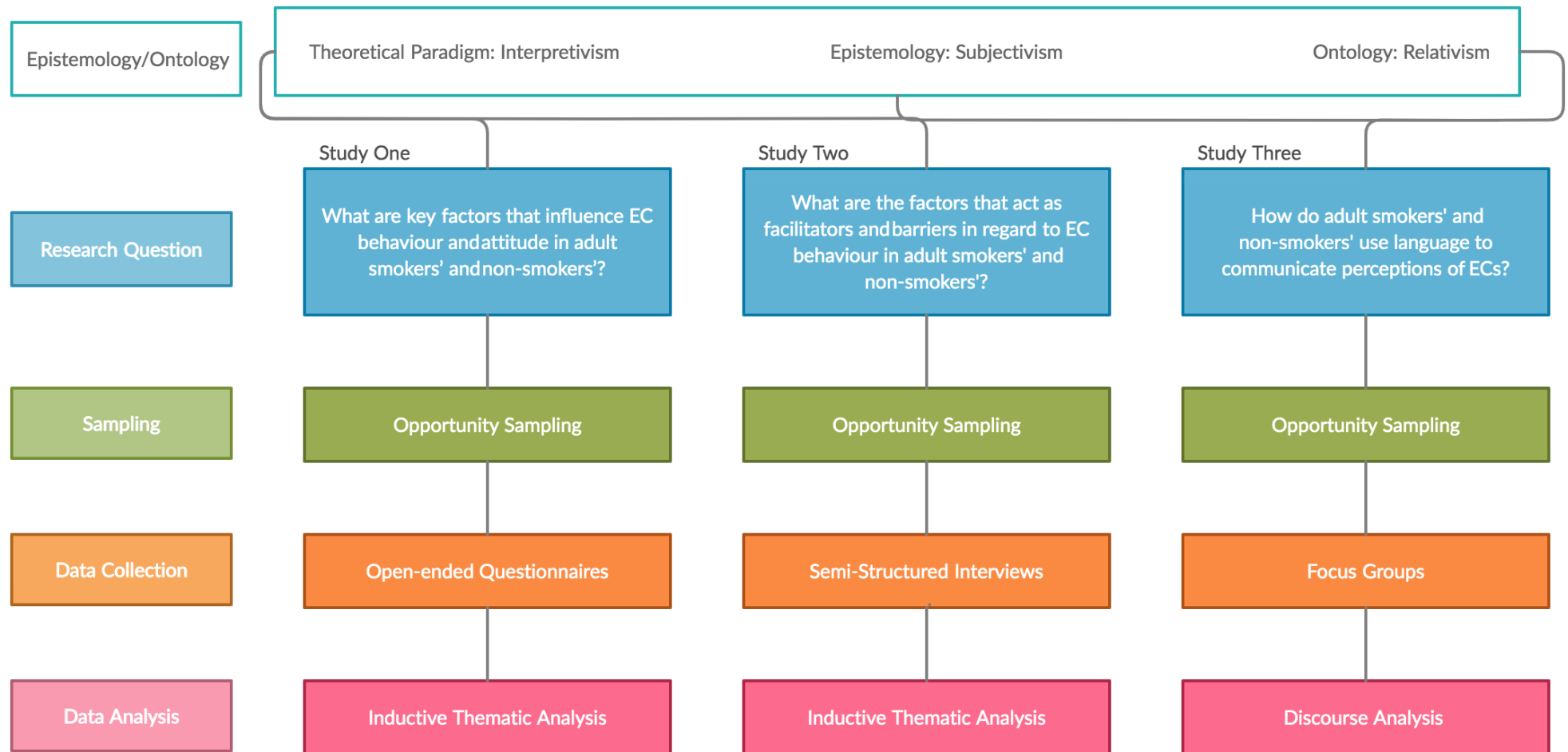


Figure 6 - Summary Diagram of the Methodological Approaches of the Three Research Studies

3.2 The Justification of Qualitative Methods

A qualitative approach provides an exploratory method that can attempt to understand facilitators and barriers of ECs by providing the researcher with an alternative means of exploring, in detail, adult smokers' and non-smokers' accounts of ECs (Creswell, 2014). Qualitative methods are most appropriate for exploration (Seale, 2007) and answering 'how' or 'what' rather than 'why' (Creswell, 2014), as opposed to a quantitative approach, which implements restricted measures and strives to summarise isolated variables in specific points in time (Yardley, 2000).

Qualitative research is broad and can encompass a wide array of different research approaches, such as ethnography, phenomenology, and grounded theory. These individual approaches within qualitative research differ in how they describe the purpose, phases, methods, and data analysis within research (Muij, 2011). Qualitative research is praised as it can collect and interpret data, generate in-depth understanding by studying individual's own meanings and providing thick descriptions of subjective experiences (Everest, 2014). Several qualitative approaches were considered once the research questions and aims for the thesis had been established, a qualitative methodological toolbox (Teherani et al., 2015) facilitated the selection of the appropriate approach for the thesis, which is displayed below in Table 6.

Table 6

Methodological Toolbox to Facilitate the Selection of the Approach

Methodology	Definition/Description	Select	Reason(s)
Grounded Theory	The development of a theory from the data that has been collected and analysed in the research (O'Leary, 2014)	No	This thesis does not aim to develop a theory
Ethnography	The investigation of a culture, society or community through in-depth fieldwork from the point of view of the participants involved in the research (O'Leary, 2014)	No	This thesis is not investigating a culture

Phenomenology	The exploration of the 'lived experience', with a particular focus on studying the inner dimensions and essences of cognitive processes (O'Leary, 2014; Percy et al., 2015)	No	This thesis is not investigating the 'lived experience' or the inner dimensions. It is focused on external content
Ethnomethodology	The study of social order. Understanding how social interaction produces the norms people use to understand society as well as themselves (O'Leary, 2014)	No	This thesis is not studying the norms people use in understanding social life
Case Study	An in-depth exploration of a singular case (event, individual, activity), over time using a variety of information (Percy et al., 2015)	No	This thesis is not exploring one case in-depth
Narrative Inquiry	A description of the experience of gathering data through participant storytelling to challenge the modernist versions of 'truth' (Conelly and Clandinin, 1990)	No	The data in this study is not gathered by storying telling and it is not presented in the form of a narrative experience of the research
Generic Qualitative Research (GQR)	Research that aims to understand a phenomenon, process or the perspectives of the people involved (Percy et al., 2015)	Yes	This thesis aims to understand and describe the factors that act as facilitators and barriers of ECs from the perspective of adult smokers and non-smokers

Some qualitative approaches were not suited to the aim of this thesis. Although, phenomenology was considered as it is often selected to tackle research questions exploring attitudes, beliefs, and feelings. However, phenomenologists' interest is on the 'essence' and internal structures of the experience of these cognitive processes, whereas this thesis is focused on the external context and what the experience was about (Percy et al., 2015). Likewise, phenomenology is focused on conscious experiencing and the inward and ongoing sense-making process, whereas the aim of this thesis is on experiences of ECs and what beliefs and attitudes point into the outer world. Researchers exploring individual accounts of external happenings should consider GQR (Kahlke, 2014). Therefore, a GQR approach was selected to accommodate the research question, as it does not fall within the established methodologies which have been discussed above.

GQR offers flexibility when research questions do not fit within the boundaries of single methodologies (Kahlke, 2014). The strict obligation to 'fit' within established methodologies has been criticised for unnecessary rigidity (Chamberlain, 2000; Sandelowski, 2000; Holloway and Todres, 2003), which is limiting as it is more beneficial to view them as fluid developing concepts that can be implemented in a variety of formats (Holloway and Todres, 2003). No research can orchestrate a pure method, conforming to the literal textbook description (Sandelowski, 2000). This flexibility under GQR has the potential to enhance research, as it provides opportunities to answer the research question using blended methodologies. GQR creates space for the overlap of boundaries and uses elements of established methodologies which are able contribute to answering the research question in the best way. GQR stemmed from a call for a 'seventh movement' in qualitative research, which strives towards pluralism, accepting that multiple perspectives should be employed before a rich understanding of phenomena can be achieved (Denzin and Lincoln, 2000).

The methodology must be understood in-depth, to apply it accurately to the context of the research and justify the decisions that have been made. GQR draws on the strengths of various approaches whilst deviating from their specificities and guidelines in a way that benefits the research (Kahlke, 2014). GQR has several characteristics of qualitative research: aiming to elicit understanding, cultivating rich explanatory findings, the researcher as a main instrument of data collection/analysis, and triangulating findings from different research studies (Merriam and Tisdell, 2009).

In the case of GQR, importance is placed on the perceptions and feelings of the participants, in this sense the approach is highly inductive. Furthermore, a GQR approach is recommended when the focus is outward, on external content and phenomena rather than 'inner feelings' (Percy et al., 2015). It is also recommended when the researcher has a body of pre-knowledge that they wish to understand from participant perspectives (Merriam and Tisdell, 2009). This approach allowed the researcher to explore EC accounts in-depth, and from different standpoints (Merriam and Tisdell, 2009) by using a combination of methods including OeQs, SSIs, and FGs.

There is no priori epistemological perspective governing GQR (Percy et al., 2015). The researcher makes decisions about how theoretical perspectives will inform the research, and to what extent. Theoretical assumptions are discussed below (Section 3.2.1).

3.2.1 Overcoming the 'Theoretical Void'

Committing to a theoretical, epistemological and ontological position is a key requirement of any rigorous research (Scotland, 2012). Theoretical paradigms refer to how an individual views the world, which is informed by epistemological and ontological positioning.

Epistemology frames how we come to know the social world surrounding us, whereas ontology refers to what constitutes our world and how we go about understanding it (Scotland, 2012). These positions outline the researcher's perspective on the 'nature of reality' and the philosophical stance that lies beneath the methodology, therefore framing the research process as they lead to varying approaches toward different phenomena (Grix, 2004). Due to the lack of epistemological and theoretical allegiances in GQR, it has been argued that the framework of the research can be poorly articulated (Atkinson and Delamont, 2006). It is important to point out that although GQR may be less theory-driven, this does not mean that it is atheoretical. Researchers make conscious choices about how and to what extent theoretical, epistemological and ontological perspectives inform the research.

Due to the emphasis this research places on smokers and non-smokers accounts of ECs, an interpretivist approach was deemed more suitable than a positivist approach. The interpretive paradigm was established by ideas from Dilthey, Husserl, and Weber (Given, 2008) who proposed that the human sciences differ ontologically and epistemologically from the positivist approach, which is derived from empiricism and the natural sciences. Interpretivist approaches intend to understand the world of human experience (Creswell, 2014). Therefore, relying on participant views of the phenomena being studied (Creswell, 2014) whilst also recognising the impact of the researcher on the research due to their background and experiences. Interpretive paradigms yield insight and understanding by focusing on the individual perspective, rather than dominating and taking over individual voice. Interpretivism proposes that people participate in unspecified life-worlds, attaching diverse interpretations and meanings to seemingly similar phenomena, presenting multiple realities (King and Horrocks, 2018). Therefore, this paradigm fits with the nature of this thesis.

Interpretivists generally adopt a relativist ontology, believing reality is a finite subjective experience which varies between people (Guba and Lincoln, 1994; Denzin and Lincoln, 2005). Individual reality emerges when consciousness meets objects with derived meaning

(Crotty, 1998). Reality is constructed through the unique interaction of language and concepts in the external world (Scotland, 2012). The interpretivist epistemology is one of subjectivism, knowledge is merely subjective and there is no external or objective truth, the outer world does not exist outside of our knowledge (Grix, 2004). This perspective allows a deeper understanding of the phenomenon within a unique context rather than a generalised basic understanding of a whole population (Creswell, 2014).

Individual experience is multi-dimensional, and the world we inhabit is more multi-ontological than a single method of theory appreciates. Therefore, a multi-dimensional framework should generate the most accurate understanding of reality (Frost and Nolas, 2011). Our actions, feelings and thoughts pertaining to power, identity, meaning-making practices and interpretation are all complexly intertwined. This means that researchers should recognise this complexity and discover suitable ways to engage with reality through multiple epistemological and ontological positions.

As such, this study exploring EC accounts does not have to be a choice between an emphasis on individual experiences of EC use, focused on self-reflection, or the social construction of ECs following real-life conversations between participants. Instead, it can adopt both of these approaches and combine them to produce a thesis that looks at both individual reflection on experience of ECs, as well as the ways in which perceptions of ECs are constructed, communicated and negotiated in everyday life by drawing on a range of analytical approaches such as thematic and discourse analysis. By engaging with varied approaches when selecting research frameworks, the conjunction of “either, or” to a conjunction of “both, and” can be attained. This type of pluralistic approach to qualitative research offers opportunity to understand the various dimensions of individual experience.

3.2.2 Overcoming the Lack of Robust Literature in GQR

To overcome the absence of robust methodological literature on GQR (Kahlke, 2014), epistemological and theoretical foundations must first be expressed (Sections 3.2, 3.2.1) as it has important implications regarding the quality of the research. This scarcity of literature on GQR forces researchers to draw on a wide array of sources when defining and justifying their methodological choices. There have been rational claims that established methodologies are more challenging, due to the prerequisites of in-depth knowledge and relevant literature. Paradoxically, this claim is also used as a rationale for

GQR by novice researchers (Caelli et al., 2003). This claim reduces GQR and does not emphasise the complex understanding that is required. Researchers are expected to think broadly about their research as they require knowledge about methodologies to be able to apply them to context, manipulate and blend them, as well as justifying the choice of dismissing relative existing arguments (Kahlke, 2014). Overreliance on rigid methodological rules and assumptions could hinder choices at all levels of the research process (Chamberlin, 2000).

3.2.3 Overcoming ‘Method-Slurring’ and Epistemological and Theoretical Congruence

Combining methodologies raises theoretical and epistemological issues of congruence. In this research, Study One and Two (OeQs and SSIs) were designed to understand individual accounts of ECs using inductive thematic analysis. Whereas Study Three (FGs) aimed to understand how ECs are constructed socially by asking how people use language to communicate perceptions of ECs, using blended discourse analysis informed by discursive perspectives. The desire to use three methods was to achieve ‘methodological triangulation’ (discussed in more detail in Section 3.9.5). The methodological segregation undertaken within the thesis was through data collection, coding, and analysis. This could raise issues concerning compatibility of the epistemological assumptions which underlie each individual study methodology. Congruence issues arise when the framework fails to account for the epistemological perspective, or when the research questions lack cohesion and are unstructured. GQR aims to alleviate congruency issues by building new research frameworks. Approaches are selected together to answer the research question more comprehensively, rather than reconciling with established methodologies at the risk of comprising the research question and outcomes of the research. Cooper and Endacot (2007) suggest some key elements of a robust GQR which are presented below in Table 7.

Table 7

Key Considerations for Generic Qualitative Research

Consideration	Implemented in this thesis

Clearly stated research goals and questions	✓
Clearly state the inductive nature of the research and ensure there are no hypotheses	✓
Produce a rich and in-depth literature review that includes both quantitative and qualitative research	✓
Clearly state that the sample may change over time, as qualitative research focuses on social world phenomena	✓
Describe methods, processes to ensure rigour and reflexive positioning	✓
Explain technical jargon throughout	✓
Discuss the implications of using multiple methods	✓

3.3 Data Collection Methods

GQR builds research designs from the ground up, enabling a rich description of EC accounts. Data collection within GQR characteristically requires methods that elicit individual accounts on external ideas. Data collection methods include interviews, FGs, observation, or document reviews (Kahlke, 2014). To address the thesis aim, three individual qualitative studies were conducted. The first study (Chapter 4) consisted of an online OeQ method to generate initial ideas about smokers' and non-smokers' accounts of ECs. The second study (Chapter 5) consisted of SSIs which asked questions related to the thematic outcomes from Study One. This was to add further insight to the results obtained from the OeQ, contributing to building coherent EC accounts. The final study used a FG method (Chapter 6) to understand how language is used to communicate perceptions of ECs. These methods of data collection are common in qualitative research and each method generates data in a unique way (Creswell, 2014). Justification and discussion of individual data collection methods can be found in Sections 3.4, 3.5 and 3.6.

3.3.1 Sampling Strategy, Recruitment and Sample Characteristics

3.3.1.1 Opportunity Sampling

Data collection in GQR seeks information from people about their experiences and accounts of external events. The aim is to generate a broad range of opinions, ideas, or reflections rather than 'going deep'. All three studies in this thesis recruited participants

using opportunity sampling. This type of sampling is based on convenience and participants are recruited from the target population who are available at the time and are willing to take part (Breakwell et al., 2012). This could be why it is often grouped with other types sampling such as purposeful sampling, convenience sampling, and volunteer sampling. It is criticised for being non-random which can result in bias (Emerson, 2015) as there is not an equal chance for all potential participants to take part. Therefore, from the positivist perspective, which states that social research should be objective (Jupp, 2006), opportunity sampling is viewed as weak in terms of external validity as it is impossible to generalise the data it produces because it is not representative. Although, non-probability sampling can be seen as beneficial in exploratory research, as the general aim is to gain initial understanding of relatively new phenomenon (Given, 2008). Additionally, qualitative research that aims to understand people's accounts and experiences when describing social issues can be useful, as non-responses are limited and only relevant data are gathered (Jupp, 2006). This form of sampling is also a pragmatic choice for researchers working with limited time and resources (Roller and Lavrakas, 2015) such as a PhD student researcher conducting three individual studies across three years.

This sampling technique falls under the interpretivist paradigm as the experience of a simple sample is significant in its own right (Scotland, 2012). Recruiting participants from the target population who are available and willing to take part can deepen our understanding of the 'how's' and 'whys' of the given phenomena, key fundamentals of an interpretivist approach. It is important for interpretivist researchers to immerse themselves in their research and be an active part of data collection and analysis so that a true understanding of the phenomena can be achieved. Intersubjectivity in qualitative research refers to not only the ways in which we share meaning with others, but also that collective understandings exist upon a scale of "mutual intelligibility" (Anderson, 2012 p.468). In various modes of research, shared understandings can provide a unique insight when exploring how complex social systems come to create meaning (Given, 2008). The importance of intersubjectivity could be reflected on here, researchers need to acknowledge their role in the research design and suggest that the research could not be possible without an involved inquiry, so this form of sampling is typically chosen to investigate certain populations of interest, rather than the larger whole of society (Creswell, 2014).

3.3.1.2 Recruitment

For all three studies, recruitment media (an example can be found in Appendix 1) were placed in a wide variety of places, these included EC shops, chemists, community notice boards, university campuses, and public libraries. Participants would indicate their interest by responding to these media. This thesis aimed to generate accounts from a broad range of participants who use ECs in different ways and for different reasons. This was so that encouraging and deterring factors of EC use were reflective of the variety of users and non-users. It was therefore important to categorise participants. The justification and decision making process of participant categories is discussed below.

ECs can be used for a variety of reasons, these mainly include quitting smoking and/or reducing CTC consumption (ASH, 2020). Therefore, the first two participant categories within this research were those who had successfully quit smoking using an EC, and those that had failed to quit smoking using an EC. There is also a substantial amount of EC users who also smoke CTCs (dual users; ASH 2020), therefore, this was the third participant category. Around 2.9% of vapers use ECs having never smoked (ASH, 2020), also referred to as the 'emerging demographic'. This demographic of individuals were the fourth category of participants. Exploring the experience of these individuals is important as they could become addicted to nicotine through a new form of delivery (Henningfield and Zaatari, 2010). There are few studies which explore non-smoker and non-vaper attitudes toward ECs. Although this demographic may not use the devices themselves, research has demonstrated the impact of peer and family influence on smoking-related behaviours (Westmaas et al., 2010; Shruthi et al., 2017) and EC behaviours (Amin et al., 2019). It is therefore logical to assume influence as a peer or family member may act as a facilitator and/or barrier in regard to others' EC use across EC behaviours. Exploring the perceptions of this demographic also develops an understanding why this demographic chooses to not use ECs, but other never-smokers such the emerging demographic choose to use them. It is important to point out that this form of self-categorisation created conceptual challenges as there was a possibility that participants could self-identify incorrectly due to social expectations, this has been explored further in Section 7.8. The participant categories are presented below:

- Category 1: I have successfully used an EC to quit smoking (former smoker/EC user)
- Category 2: I have failed to quit smoking using an EC (current smoker)
- Category 3: I use an EC and smoke CTCs habitually (dual user)
- Category 4: I have never smoked CTCs but use an EC (EC user – emerging demographic)
- Category 5: I have never used an EC or smoked CTCs (non-smoker)

3.3.2 Pilot Work on Participant Categories

The original version of the OeQ in Study One prior to pilot work was used to define, finalise and justify the final participant categories. Procedural details of the pilot study can be found in Section 4.3. This indicated there was a participant category missing which would cover smokers who have tried an EC but had no intention of quitting, so this category was added. To facilitate the addition of the category, titles of the categories were changed. This was to ensure their structure was similar but also allowed a differentiation between Category 3 and Category 4. The order of the categories was also rearranged to make them more logical. Finalised categories are presented below, those eligible to participate in the studies were required to self-identify with one of the six categories (limitations of self-categorisation are discussed in Section 7.6). Alternative eligibility criteria are also presented below.

- Category 1: I have successfully used an EC to quit smoking (former smoker/EC user)
- Category 2: I am a smoker who has tried to quit smoking using an EC but has failed to quit (current smoker with intentions of quitting)
- Category 3: I am a smoker who uses ECs regularly but has no intention to quit (dual user)
- Category 4: I am a smoker who has tried ECs but has no intention to quit
- Category 5: I have never been a conventional smoker but I use ECs regularly (EC user - emerging demographic)
- Category 6: I have never smoked conventional cigarettes or used an EC

3.3.3 Inclusion Criteria

- Those eligible were required to self-identify with one of the six categories discussed and justified above
- Participants were required to be over the age of 18 because the research aims to explore adult smokers and non-smokers accounts of ECs. This is also the legal age for sale of ECs in the UK
- There were no upper age limits and there were also no gender or ethnicity limitations across the research as the sample aimed to consist of a diverse range of participants in order to capture a range of accounts to allow maximum variation and a rich but broad understanding of facilitators and barriers of ECs

3.3.4 Exclusion Criteria

- Participants who were not able to communicate effectively in English were not permitted to take part in all three studies. This was because the research was in English and for ethical and practical reasons, all participants needed to be able to fully understand the features of the research as well as their contribution to it. If participants not proficient in English were included, they may not have fully understood all aspects of the research including their rights as participants. Equally, the analysis of data relied on language and its interpretation and meaning could be lost if a translator were to be used (Kaprog and Bertero, 2003; van Nes et al., 2010).

Participant details for individual studies can be found in Sections 4.4.1, 5.2.2 and 6.2.2.

3.4 Study One: Open-ended Questionnaires

The first study used an online OeQ method to explore and generate initial ideas about adult smokers' and non-smokers' accounts. The internet is a commonly implemented practical research tool with many advantages. Firstly, online data collection methods can reach a wider audience in a shorter space of time (Granello and Wheaton 2004; Lefever et al., 2007) as well as receive more timely responses. This was the ideal way to commence data collection in the thesis, by obtaining a wide array of EC accounts to generate initial understanding and to develop a more effective interview schedule for the second study. Online open-ended questions also allow participants to use their own language and expressions when typing responses. Additionally, due to the level of anonymity provided by

online methods, they have been described as a positive experience for participants, which may have encouraged them to share more personal and honest perspectives (Evans and Mathur, 2005). Research has also found that participants feel more protected when reporting certain issues using online methods (Evans and Mathur, 2005). For this reason, the OeQ may have identified areas of EC use that may not have been disclosed using the face-to-face methods that have been used in the other studies within this thesis.

It is important to consider the limitations of OeQs. It has been suggested that this method may create sampling issues (Wright, 2006) as the online format means it was only accessible to potential participants who had access to, and were fluent in, using technology. Additionally, there are always some individuals who are more likely to take part in surveys than others, and there is also no guarantee that accurate demographic or characteristic information is being provided. Furthermore, the online OeQ is self-administered (Lavrakas, 2008), meaning the participant is responsible for typing their own answer which can result in some respondent-related errors such as, missing answers, incomplete responses and misunderstood terminology. The format of the questionnaire can attempt to reduce some of these errors, as an example, the size of the typing space provided acts as a visual cue on how much information is expected. The size of the answer space was the same for all open-ended questions. Finally, responses are limited using this method, and the researcher can neither probe for more information nor seek confirmation unlike face-to-face methods (Wright, 2006).

When all is considered, the researcher deemed it sensible to choose an online OeQ as the first method of data collection in this thesis. The OeQ was developed using previous literature and guidance from supervisors (detailed procedure in Section 4.4.2 and 4.4.3). The questionnaire was predominantly open to produce rich exploratory data (Creswell, 2014) which could then be used to develop and influence the interview schedule for the subsequent study. However, there were some closed questions within the OeQ. The closed questions provided demographic information and a limited amount of quantitative data. All closed questions that were asked were followed by a text entry answer, asking participants to expand and explain the reasons behind the answer. In this sense, the closed questions acted as prompting questions, preparing the participant to think about a certain elements of ECs to be able to expand on these elements and discuss in more detail.

3.5 Study Two: Semi-Structured Interviews (SSIs)

SSIs were used in Study Two to provide further insight into the factors that act as facilitators and barriers of ECs obtained from the OeQ design in the first study (Rubin and Rubin, 2005). Given their flexibility, SSIs are one of the most frequently used methods within qualitative research (DiCicco-Bloom and Crabtree, 2006; Kallio et al., 2016). The adaptability of SSIs means all topics of interest can be explored without directly impinging on individual narratives (Creswell, 2014). This form of data collection enables meaningful interactions between research and participant (Galletta, 2013). It also allows the researcher to seek confirmation of interpretations and observe non-verbal behaviour (Rubin and Rubin, 2005). Given that the wider focus of this PhD is on EC accounts, the SSIs provide a more flexible and useful method for adding further insight to the results obtained from the questionnaire method used in Study One (Rubin and Rubin, 2005). The SSIs allowed researcher to probe for more information and seek confirmation unlike the OeQ method (Wright, 2006). This was considered a particularly important step in presenting a coherent and in-depth reflection of EC accounts. The interviews explored individual accounts of EC use, encouraging self-reflection on EC experiences.

Telephone interviews were considered but the researcher decided to conduct of face-to-face interviews for several reasons. Firstly, interviews conducted over the phone can restrict the level of rapport that can be built between researcher and participant, which is essential when trying to gather high-quality data (Gubrium and Holstein, 2002). As well as this, telephone interviews are more appropriate for structured interviewing (Rubin and Rubin, 2005). Additionally, lack of visual cues can affect how information is conveyed (Gubrium and Holstein, 2002).

Although the interview process is no doubt a valuable means of collecting rich data, it is not without its critiques. The interaction between the interviewer and interviewee can vary drastically, meaning the quality of responses may differ between participants (Cohen et al., 2011), although this is recognised in interpretivist research. Additionally, the data quality can also vary depending on the prior experience, skills, and internal biases of the interviewer. To overcome this, guidelines from McGrath et al. (2018) were followed. These emphasise the importance of preparing as an interviewer, constructing a schedule to test questions, paying attention to the cultural and power dimensions of the interview,

maintaining awareness that the interviewer was a co-creator of data and being prepared for unexpected and potentially emotional topics.

Questions were flexible and could be modified in response to the participants' reply (Seale, 2007). Whilst there was a topic area to be explored, it was also important to enter as far as possible into the participants' world by probing interesting topic areas that arose (Galletta, 2013). For example, participants that used ECs were often keen to show and discuss physical aspects of their device, the researcher would ask appropriate questions about the device depending on each conversation. In this sense, the participants led the interview and could introduce topic areas that the researcher may not have initially thought of (Seale, 2007). Although, it is important to note that this did not mean the interview was without structure. To fully cover the research question, in-line with guidelines for GQR and recommendations by McGrath et al. (2018), the interviewer had a schedule, which served to guide the conversation to lessen the chance of important topics being neglected. The interview schedule was built upon previous literature, thematic outcomes from Study One and guidance from the supervisory team. The schedule ensured the interviewer was reminded at all times of the research question to ensure conversations did not go too far off-topic. It was understood by the interviewer that the schedule may not necessarily be followed chronologically to follow fruitful lines of inquiry or elicit greater detail from interviewees (Given, 2008). However, the research did cover all the themes during all interviews. This was important as it achieves some of the quality criteria (dependability and reliability, discussed in Section 3.9.3), as the same topic areas were discussed with all participants, although the order may have varied. Detailed procedures of data collection can be found in Sections 5.2.3 and 5.2.4.

Although alternative qualitative methods could have been used to generate data on accounts of ECs, SSIs were a purposeful strategic methodological choice. Firstly, this method provides further and more in-depth insight into the findings from the first study. It also acts as a complementary method to the FGs utilised in Study Three, as the SSIs explore individual accounts whereas the FGs explore how ECs are discussed between participants.

3.6 Thematic Analysis

For both Study One and Study Two, the data-driven inductive approach of thematic analysis (TA) was used to analyse the data. TA is one of the most common forms of qualitative data analysis (Silverman, 2006). Yet, it has been criticised for being poorly described and having no clear criteria for identifying themes (Bryman, 2012) meaning it can be blurred with other qualitative approaches such as content analysis. For this reason, Braun and Clarke's (2006) guidelines were followed when conducting analysis. Step-by-step procedural details of analysis for individual studies can be found in Section 4.4.4 and 5.2.5. The following will justify the use of thematic analysis in both these studies.

TA involves the identification of meaningful themes, coding and classifying textual data accordingly, and interpreting the data by seeking commonalities, relationships or theoretical constructs (Braun and Clarke, 2006). TA can accurately capture complexities and meaning of a given phenomenon within a textual data set (Guest et al., 2012). Flexibility is an important aspect of TA, unlike other alternative analytical approaches which are often grounded in theoretical and epistemological positions, TA can be applied across a range of positions (Braun and Clarke, 2006). Given the exploratory nature of these studies, TA was deemed the most appropriate method for analysing the data from Study One and Study Two, as it would capture the complexities of the key factors that influence behaviour and opinion of ECs (Study One) and the factors that act as facilitators and barriers of ECs (Study Two)

TA proposes that it is the researchers' decision as to whether they explore the literature before or after data collection (Braun and Clarke, 2006). In this thesis, prior to data collection in both studies, a thorough review of the literature was conducted. Silverman (2012) suggests that preceding conceptual orientation is important so one can recognise and understand the field they are studying. The analytical strategy was inductive and data-driven at the latent level, meaning the researcher identified and explored the underlying ideas, assumptions and conceptualisations (Willig, 2013). Therefore, denoting that the outcome of both analyses was derived from imperative work and are theorised rather than descriptive. Inductive TA maintains the attention on the data, and arising themes are a product of the data itself bearing little relation to the researchers' theoretical interests. Inductive analysis codes data whilst avoiding fitting in to pre-existing coding frames (Braun and Clarke, 2006). Although, it is important to note that data can never be coded in an

epistemological vacuum and researchers can never fully be free of their theoretical and epistemological ideologies (Silverman, 2006).

3.7 Study Three: Focus Groups

The final study utilised a FG method to understand how people use language to communicate perceptions of ECs in attempt to understand social conceptualisations of them. This is important because it provides an opportunity to address the research question from a different standpoint than the previous studies. FGs typically involve a small number of participants engaging in a discussion(s) focused on a particular topic (Krueger and Casey, 2014). Unlike the one-to-one interviews that were implemented in Study Two, participants talk mostly to each other rather than the researcher, as a result, it is anticipated that their talk is more reflective of natural speech. This form of data collection is the best way to access natural language and conversation resulting in rich and authentic data (Wilkinson, 2003).

This method was chosen as it complements the methods used in the previous studies as the environment is socially orientated, the social interaction may probe responses from individuals that would not have arisen in an OeQ or SSI (Kruger and Casey, 2014). This environment allows participants to respond to interactions, yielding important information that contributes uniquely to the research aim by providing insight into how social interactions can facilitate or deter EC use. This methodology enabled a shift in power away from the researcher and toward the research participants when compared to the previous two studies. It is assumed that this power shift allows participants to feel more comfortable and able to assert their own agendas (Kitzinger, 1994). FGs also include dynamic participant-to-participant interaction (Kitzinger, 1994) which maximise insight gathered (Morgan, 2009). The natural discussions provide opportunities for an interactive exchange of views between participants, meaning as a data collection method they are less impacted by the researchers' influence.

Although a commonly used data collection method in qualitative research, FGs are not without critique. FGs do not fully eliminate the power differential and although the researcher is adopting a minor role, their presence may still impact participant disclosure (Morgan, 2009). Additionally, there may be overlapping talk and some participants' voice may dominate whilst others remain relatively suppressed (Morgan, 2009).

The FG experience can be empowering for some participants, as they are given the chance to work collaboratively with others in decision making processes (Wilkinson, 2003). In groups that work well, trust develops and they can enjoy exploring topics together (Kitzinger, 1994). These benefits make the FG methodology particularly well suited to the aim of the individual study, as well as complementing the methods used other studies in this thesis.

Typical FGs aim to bring together participants that are similar in some way (Given, 2008). However, for this study the researcher decided to implement heterogenous FGs. Heterogenous FGs in this instance refer to participant category (categories are justified and discussed above in 3.3.1). The FGs contained participants from across categories with varied EC/smoking experiences, rather than participants that were all in the same category. Heterogenous groups stimulate different points of view and generate depth of understanding by listening to participants defend their way of thinking (Roller and Lavrakas, 2015). Heterogenous groups are also a pragmatic choice for researchers working with limited time and financial resources (Roller and Lavrakas, 2015). Additionally, heterogeneous groups enable the exploration of multiple perspectives at one time, providing a broad insight into participant accounts (Bryman, 2012). It also provides an opportunity for the researcher to gain insight into how consensus and/or disagreement within the group is formulated, which can lead to an in-depth discussion as participants defend and negotiate their experiences (Kitzinger, 2005).

FGs provide a method of understanding the important social factors which influence health-related behaviours. In the context of adults' EC accounts, FG research provided access and understanding of how ECs are constructed and negotiated within groups and how the group situation impacts the way they are discussed and debated. There is little qualitative research looking at ECs accounts generated from FGs and explored discursively.

3.7.1 Online Focus Groups

The first FG was conducted face-to-face, but as a result of the Covid-19 outbreak and following government advice, the second FG was conducted online using Zoom, a videotelephony and online chat platform. Online FGs have been criticised as technical issues can disrupt the natural flow of conversation (Tates et al., 2009), which can limit

spontaneous feedback and discussion. Additionally, online FG methods hinder verbal communication and bodily cues which are key elements of conversation (Stewart and Williams, 2005).

Online FGs can be beneficial for a number of reasons. Firstly, and of the most relevance when considering the reasons behind the online movement of this study, online FGs are flexible and can allow conversation and discussion to take place when participants and researcher cannot come together in real life (Tates et al., 2009). Online FGs have been shown to significantly reduce respondent bias (Tates et al., 2009). Respondent bias essentially assumes that more assertive participants will assume the role of 'alpha' and be more dominant in the discussion (Kruger and Casey, 2009). Additionally, participants can choose to have their camera switched off, which may mean they share more sensitive information due to the anonymity (Tates et al., 2009). There is also the added benefit of geographical independency and accessing hard-to-reach respondents. However, it is important to point out that those who were taking part in the online FG had already been arranged before the national lockdown, and would have otherwise attended a face-to-face discussion, so this may not be as relevant for this study.

3.8 Discourse Analysis

Discourse analysis (DA) was chosen to analyse the FG data. DA lends itself to the analysis of data derived from FGs as it stems from discursive interactions between participants (Onwuegbuie et al., 2009). There is no single procedure for DA (Willig, 2013), different studies have different procedures, meaning analysis is established with sensitivity to the context of the study. Some types of DA, such as Critical Discourse Analysis (Van Dijk, 2001; Jørgensen and Phillips, 2002) and Foucauldian Discourse Analysis (Arribas-Ayllon and Walkerdine, 2017) broadly focus how language is organised in wider social contexts, mechanisms of power and how these are taken for granted. Potter and Wetherell (1987) emphasise the importance of not dwelling on distinctions between different versions of DA, and therefore advocate a synthesis or a 'blended approach' to DA (Wetherell et al., 2001), which has been adopted in this study as it enables validation of a range of approaches to DA. A blended approach to DA can reconceptualise the false dichotomy between external social structures and individual agents, by acknowledging and highlighting their interdependence (Burr, 2003; Willig, 2013). This fits with the relativist ontology of the thesis, which understands that individual reality emerges when consciousness meets objects with

derived meaning (Crotty, 1998). Just like any form of analysis, it is important to assert a clear rationale for carrying out a DA. The rationale for adopting the blended version of DA (Wetherell et al., 2001) is because it facilitates the aims of Study Three which explores how language is used to communicate perceptions of ECs. The focus on language in context means that a TA would not be an appropriate form of analysis for this study, as TA involves identifying and interpreting patterns in order to generate themes.

Methodological decisions that are based on the research question is also a key component of the wider GQR methodology underpinning the whole thesis. The blended version of DA also fits when the complexity of ECs are considered, as analysing group discussions through a blended lens can assist with the consideration of particular discursive practices and how participants position and present their own account within the wider societal discourse. Blended DA posits that language is not a neutral communication tool that accurately depicts reality, instead it constructs and defines social life, which people assign meaning through language. The idea that language is more than a reflection of the world and phenomena is of central importance in constructing the ideas and social processes that make up our social world. Talk is therefore understood as an action devised for specific contexts (Potter, 1996).

The DA was informed by features of Discursive Psychology (DP; Edwards and Potter, 1992). One of the key elements of DP is that 'what is happening out there' is achieved by the account, rather than something that pre-exists. DP is founded on three core principles (Wiggins and Potter 2008). Firstly, discourse is constructed and constructive, it assembles words (linguistic building blocks) and uses these words to construct certain versions of the world. Even if the hearers do not accept the speakers construction of the world, it has still been made and still matters. The illocutionary element of discourse is the focus, rather than perlocutionary dimension, which rejects the notion that language is a direct reflection of underlying cognitions, meanings and feelings (Alvesson and Kärreman 2000; Marshak et al., 2000).

The second principle of DP, is that discourse is action-oriented, meaning it is the most important method of accomplishing social actions. As an example, talk and conversation can be used to justify, excuse, blame and so forth. Finally, according to DP, discourse is positioned uniquely in relation to the sequential organisation, the contextual setting and the wider rhetorical frame in which it exists. This means that discourse is context dependent

and context reproducing, as it is a product of the immediate context but also builds new context for what follows (Edwards and Potter, 1992).

A generic feature of discursive approaches that distinguishes them from cognate methods is that they are attuned to these previously discussed elements of context when examining an episode of verbal interaction (Wiggins and Potter, 2008). DP often draws on concepts from conversational analysis, particularly the focus on how language is organised within naturally occurring conversation. Although, DP distinguishes itself from conversation analysis, as the focus is also on the socially constructed concepts (Potter and Hepburn, 2005). For this reason, the analysis on the data generated from the FGs is focused on naturally occurring talk, rather than the work on rhetoric (Billig 1999), although this is not to say that rhetorical concepts are not reflected on whatsoever.

This analysis was therefore deemed appropriate because analysing talk can facilitate the understanding of how objects are positioned within discourse. It also complements the understanding of EC accounts generated in the previous two studies. Detailed procedural information regarding the process of analysis for Study Three can be found in Sections 6.2.3, 6.2.3.1 and 6.2.4.

3.9 Research Integrity

Research integrity is of paramount importance across research (Given, 2008). Qualitative research conducted within the interpretivist paradigm rejects a foundational base to knowledge, which naturally questions its validity. Although interpretivist research cannot be judged using the same criteria as positivist research because interpretivist research is not value-free and is inextricably linked to the biases, goals, and experiences of the researcher (Lincoln and Guba, 1985), meaning it is difficult to be truly neutral and objective. However, it is still possible to obtain trustworthiness and legitimacy without claiming uncontested certainty by acknowledging the values and assumptions that frame the research.

Lincoln and Guba (1985) and Shenton (2004) suggest four criteria for developing the trustworthiness of a qualitative inquiry: credibility, transferability dependability and confirmability. These criteria attempt to represent parallels of positivist criteria of internal validity, reliability, objectivity, and external validity which, as previously discussed, are inappropriate regarding quality control in qualitative research (Yardley, 2008). Qualitative

research is 'good' if it can provide rich evidence embedded in justifiable and credible (credibility) data, can be applied to alternative situations (transferability) and the research process can be replicated (dependability) (Richie and Lewis, 2003; Cohen et al., 2011).

3.9.1 Credibility

Credibility mirrors the positivist concept of validity and is concerned with the extent at which any conclusions that have been drawn from the research can provide a precise account of what occurred during the research, or an accurate elucidation of what happens and why (Jupp, 2006). It is important to establish confidence in the truth and accuracy of the research findings by ensuring there is congruence between the respondents' views and the researchers' interpretation of these views. Below are the steps taken throughout the process of this thesis to promote confidence that the accounts have been recorded accurately, following guidelines from Shenton (2004).

Throughout the discussion of findings in all three studies in this thesis, participants' own words and quotes were used (Patton, 2002). Rich contextual details were also provided about each individual study (Chapters 4,5,6). Providing thick descriptions has been suggested as a method of improving and enhancing credibility within qualitative research (Denzin, 1978) as it provides a picture of not only the participant experience but the context in which it occurs (Morrow, 2005).

Tactics to ensure honesty from participants are also important in enhancing credibility (Shenton, 2004). All participants were given the opportunity to refuse (this was also an ethical requirement), meaning those who took part were sincerely willing to share their accounts. Throughout data collection, the independent and neutral status of the researcher was emphasised, and participants were encouraged to be honest. An additional way of enhancing credibility of qualitative research is to employ data collection procedures that have been successfully utilised in similar projects. Alternative research exploring EC use has successfully implemented questionnaires (Etter and Bullen, 2014; Berg et al., 2014; Sherrat et al., 2016; Etter, 2018), qualitative interviews (McQueen et al., 2011; Barbeau et al., 2013; Wadsworth et al., 2016; Simmons et al., 2016; Harrell et al., 2019; Brown et al., 2020) and FGs (Pokhrel et al., 2015; Hilton et al., 2016; Katz et al., 2019).

Shenton (2004) also suggests regular debriefing meetings between the researcher and wider members of the research team. Throughout the process of the thesis, the researcher

was in regular contact with supervisors, which consisted of 5 academics, two from psychology and three from public health, meaning the research benefitted from having a range of perspectives to improve credibility. Opportunities for scrutiny were undertaken, including presenting the research at professional conferences to receive feedback from colleagues, peers and academics. Study One was written up for publication and published in *The Journal of Health Psychology* (Wilson et al., 2020). As a published paper, the research went through the peer review process. Study Two has recently been accepted for publication in *Psychology & Health* (Wilson et al., 2021). The previously discussed steps were taken to ensure that fresh and alternative perspectives were considered throughout the progress of the thesis. This is beneficial and increases credibility, as often closeness to the project can sometimes inhibit the ability to view it with true detachment (Shenton, 2004).

3.9.2 Transferability

Transferability is equivalent to the positivist concept of generalisability. It refers to the extent that qualitative findings have applicability in alternative contexts. Unlike quantitative research, generalisability is dependent on theoretical interpretations rather than statistical criteria (Bryman, 2012). Although the lack of generalisability could be considered a weakness of the thesis, the research was exploratory in nature and was not designed to fulfil the requirements of generalisability and instead garner individual accounts of ECs.

As previously discussed, this thesis aimed to generate accounts from a broad range of participants (participant categories discussed in Section 3.3.1). This was because accounts from participants with a range of diverse smoking/vaping experiences may be transferrable to other situations. Bassey (1981) proposed that, findings may be related to individual positions if the context is similar to that described in the research. This is only if sufficient contextual information is provided to enable the reader to make these transfers (Shenton, 2004). The researcher provided thick descriptions so transferability can be judged by those who wish to transfer any findings (Lincoln and Guba, 1985). Shenton (2004) proposes six forms of information about the research that should be provided in detail throughout the thesis before any attempt at transference is made. This information is provided below in Table 8.

Table 8

Information to Enhance Transferability of the Research

Information	Included in Thesis	Details
Information on participants, how they could contribute and why	✓	Inclusion and Exclusion Criteria discussed in Chapter 3 and it is made clear that these criteria are consistent across all studies in the thesis
The number of participants involved in the fieldwork	✓	Overall, 73 participants took part in this research Details of number of participants in each individual study discussed in Sections 4.4.1, 5.2.2 and 6.2.2
Methods that were employed to collect data	✓	OeQs, SSIs, and FGs, discussed and justified in Sections 3.4, 3.5 and 3.7 Detailed procedural information on the individual methods employed can be found in Sections 4.4.2, 4.4.3, 5.2.3, 5.2.4, 6.2.3, 6.2.3.1 and 6.2.4
Details of data collection sessions	✓	Details of individual study lengths can be found in Sections 4.2, 5.2.1 and 6.2.1
The time period over which the data were collected	✓	Data from all three studies: October 2018 – May 2020 Time period for data collection in individual studies discussed in Sections 4.4.3, 5.2.4 and 6.2.4

Qualitative research can provide baseline understandings to which relating work can be compared, as a true understanding is gained gradually through several studies, rather than one individual isolated study. Even if findings from similar research offer inconsistent results, this does not mean that either are incorrect or untrustworthy, it simply reflects the multiplicity of individual realities. An understanding and appreciation of variabilities can be just as useful as the actual data (Shenton, 2004).

3.9.3 Dependability

Dependability in qualitative research is related to the stability (reliability) of the data over time and varying conditions. Dependability can be achieved through honest and detailed reporting of the research, allowing potential replication in the future. There are overlaps between credibility and dependability (Lincoln and Guba, 1985), essentially to attain dependability, credibility must also be achieved. This may be achieved by overlapping methods, which has been implemented in this thesis.

As previously discussed, interpretivist research rejects the idea that external reality is objective and knowledge about it can be gathered mechanistically. Instead, the values and beliefs of the researcher impact data collection and knowledge is constructed through the interaction. It is important to take steps to ensure that the researchers' interpretations are not fictitious. This can be achieved by transparently documenting all the processes of the research and justifying the logic of the interpretations. This has been attained by evidencing a clearly documented research process by providing rich contextual details of each study (Tobin and Begley, 2004) in Chapters 4,5,6. Research may also demonstrate dependability by allowing the research process to be audited (Koch, 1994) which is discussed below (Section 3.9.6). Shenton (2004) recommends sections that should be included in qualitative research to enhance dependability, these sections and their location within the thesis are displayed below in Table 9.

Table 9

Enhancing Dependability within the Thesis

Section to Enhance Dependability	Description	Location in Thesis
Research design and implementation	Descriptions of research planning and execution	Chapter 3 - Research Methodology for full thesis
	Describing what was planned and executed on a strategic level	Chapter 4,5,6 individual study methodologies
Operational and procedural details of data collection	Addressing describing and justifying all intricacies of all data collection steps	Detailed procedural information and data collection strategies can be found in Sections 4.4.2, 4.4.3, 5.2.3, 5.2.4, 6.2.3, 6.2.3.1 and 6.2.4

Reflective appraisal of the project	Evaluating the effectiveness of the process of the inquiry	Reflections on the Research Process – Section 7.8
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3.9.4 Confirmability

Confirmability, the potential for congruence between two independents regarding data accuracy and relevance. This can be achieved by ensuring that procedures are taken to demonstrate that findings have been identified from the data set, eliminating researcher bias (Lincoln and Guba, 1985). In this thesis, the researcher demonstrates how conclusions and interpretations have been reached with a strenuous effort to ensure the participants' voice is reflected, rather than any biases of the researcher. Confirmability can only be established when credibility, transferability, and dependability are all achieved. Confirmability was addressed throughout as findings were corroborated with evidence from different sources, for example themes were supported by numerous quotes. Confirmability was also achieved by methodological triangulation which is discussed below in more detail.

3.9.5 Methodological Triangulation

Methodological triangulation uses multiple methods to draw a more comprehensive answer to the research question, whilst also increasing validity (transferability) through the convergence of data from multiple sources (Carter et al., 2014) to better unravel the processes under study. Triangulation aims to overcome the potential bias that may arise from single-methods, single-observers, and single-theory research (Denzin, 1978). Combining methods can have greater reliability than independent methods, if reaching the same conclusions (Denzin, 1978). Exploring a phenomena from a range of stand points can also do justice to the varieties of human expression, avoiding reductionism (Clarke et al., 2014).

A diverse and rich blend of data generated from the OeQs, SSIs and FGs provide an opportunity to evaluate the extent to which a consistent and coherent picture of ECs accounts has been identified (Carter et al., 2014). For example, the OeQ may miss ideas and perspectives as a result of it being a less impersonal process, however, value can be added to this with the interviews utilised in Study Two. The OeQ and SSIs may miss how

accounts differ when discussed in a social environment, but the FGs are used to provide insight in this instance. The use of pluralism (multiple analytical strategies) also contributes to overcoming the bias of single analysis as it presents a relational analysis that can further explore the possible relationships between different analytical choices and outcomes (Carter et al., 2014). The key interest in this thesis is to bring findings from each together as collective findings (Frost and Nolan, 2011).

It is important to point out that the form of triangulation used in this thesis may differ from traditional methods of triangulation found in the literature that usually discusses mixed method triangulation with substantial quantitative elements. Triangulation in this thesis specifically refers to using findings from each study to inform the successive study, and assuming that findings are highlighted if they are supported by the multiple sources.

The key findings from the three data sources were compared and contrasted according to the research aims. Triangulation of the data from all three sources is an iterative process, whereby initial ideas about the perceptions of ECs (generated by the OeQs) guide the exploration of successive individual accounts (SSIs) then further enriched by conceptualisation (FGs). Each study used methods that contributed to answering the research question from a different standpoint. By combining methods, a full and more comprehensive answer to the overarching research question has been possible (Carter et al., 2014).

3.9.6 Reflexivity as the Central Audit Trail

As previously discussed, the beliefs and assumptions of the researcher influence how they collect, analyse, interpret and present data and it is important to be transparent about these beliefs (Austin and Sutton, 2014). A reflexive journal was used to record internal and external dialogue of the researcher as well as documenting the logistics and justifications of methodological decisions. Reflections on the research process have been discussed at the end of the thesis (Section 7.8). The position of the researcher has also been disclosed in Section 1.5.

3.10 Ethical and Practical Issues

Ethical considerations are a vital aspect of all research. All three studies in the thesis were ethically approved by Manchester Metropolitan University's ethics committee, on the Ethics

Online System (EthOS), in line with the British Psychological Society's (2009) guidelines. Individual study ethics reference numbers can be found in Section 4.4.2, 5.2.3 and 6.2.3. The research was also conducted in compliance with the Psychology Department Safe Working Practices (Chatzidamianos, 2016) and the Manchester Metropolitan University distress protocol. This protocol highlights the appropriate steps to follow for managing distress in the context of data collection, management and transcription. Although, this was not needed at any point during any stages of the thesis.

Participants were provided with information sheets (an example of a participant information sheet can be found in Appendix 2) before each study so they could provide informed consent (an example can be found in Appendix 3) before any data were collected. The information sheet made it clear that all data would be kept anonymous and confidential, and informed participants that quotations from the OeQs, SSIs, and FGs may be used in reports and possibly publications, but no personal information would be linked to any of the data. There was no psychological or physical harm for the participants when taking part in all three research studies and they were also informed that their participation was entirely voluntary, and they could withdraw their data up to one month after they had completed whichever study they took part in. However, no participants across all three studies requested to have any of their data withdrawn. Upon completion of either the OeQ, SSI or FG, participants were thanked for their contribution and de-briefed (an example de-brief can be found in Appendix 4). Detailed descriptions of the procedures and data collection aspects of individual studies can be found in Sections 4.4.2, 4.4.3, 5.2.3, 5.2.4, 6.2.3, 6.2.3.1 and 6.2.4.

All data were stored on a password protected computer and only the researcher had access to the full range of participant information. The interviews and FGs were recorded on a personal Dictaphone recorder, which was kept in a safe place at all times. Once the recordings had been uploaded to the computer and kept under encrypted password they were wiped from the Dictaphone. The transcription process for the SSIs and FGs were undertaken by the researcher and identifying information was anonymised or removed. All interview data and files will be deleted once this thesis is complete.

One risk for the participants taking part, although considered unlikely, was potential distress due to sensitive topics that could arise such as fatal illnesses from smoking. The

information sheet informed participants that they did not have to disclose anything they would not like to and could withdraw from the study at any point without consequence. This was also reiterated face-to-face by the researcher in both Study Two and Three. As well as this, participants were given contact details of relevant helplines in the previously mentioned debrief for each study.

The researcher was a lone researcher and data collection in Studies One and Two were with participants that were sometimes strangers. Therefore, the researcher ensured that when they took place, relevant people were informed of their location. Additionally, all interviews and FGs took place in a public building rather than a private space, other than the online FG.

It is important to point out that, with regard to the FGs, the nature of them means confidentiality cannot be guaranteed. Participants were informed of this and were asked not to repeat what was said in the discussion to anyone outside of it. Participants were asked to use pseudonyms when partaking in the focus group discussion.

3.11 Chapter Summary

The information in this chapter has outlined the epistemological and ontological underpinnings of the research, as well providing a justification for the methodological decisions that have been made to address the research questions for individual studies. It has also discussed strategies to ensure methodological rigour and ethical considerations. The next three chapters of the thesis will communicate the findings of the individual research studies conducted. In each, a comprehensive method section is included to help contextually frame the research and provide an overview of the data collection and data analysis methods utilised.

Chapter IV – Study One: What are the factors that influence EC behaviour and opinion in adult smokers and non-smokers?

4.1 Introduction to Chapter

Chapter 3 discussed the methodological, epistemological, ontological and ethical considerations of the thesis, as well as individual research methodologies and strategies to ensure rigour. The literature review (Chapter 2) gave an in-depth discussion of the relevant literature surrounding ECs and highlighted the need for qualitative study looking at both adult smokers and non-smokers accounts of ECs. This chapter seeks to generate initial EC accounts, to provide thematic outcomes as guidance for the SSI interview schedule applied in Study Two. The research outlined in this chapter uses an online OeQ to explore individual accounts, exploring the research question; ‘what are the factors that influence EC behaviour and opinion in adult smokers and non-smokers?’. This chapter will present an overview of the methodology, results, and a general conclusion of the findings from this study.

This study has been accepted for publication in the *Journal of Health Psychology*:

Wilson, G., Grogan, S., Powell, S., Gee, I., Porcellato, L. and Keenan, J. (2020) 'A thematic analysis of smokers' and non-smokers' accounts of E-cigarettes'. *Journal of Health Psychology*. DOI <https://doi.org/10.1177/1359105320909877>

4.2 Design

To achieve insight into smokers' and non-smokers accounts of EC use, an OeQ design was employed. This qualitative method provides exploratory approach that can comprehend influencing factors of EC use (Creswell, 2014) which may not be captured when using quantitative methods. To encourage disclosure, participants were asked to complete a series of questions anonymously online. Justification of these methodological choices have been discussed in Section 3.4. Pilot work was conducted an original version of the OeQ.

4.3 Pilot Study

The pilot study was utilised to identify potential problem areas and deficiencies in the questionnaire prior to its implementation, as well as to test the general soundness of the questionnaire (Jupp, 2006). The pilot work was conducted with 13 participants, participant

demographic variables for this pilot study are illustrated below in Table 10. The participants were colleagues of the researcher who were asked to complete the original version of the OeQ. The researcher asked for feedback face-to-face, changes were also discussed with the supervisory team.

Table 10

Demographic Variables of the Participants in the Pilot Study for Study One

Demographic Variable	Number of Participants	Percentage of Participants
Age (in years)		
Median: 34.3		
Range: 23-59		
Gender		
Male	6	46.2%
Female	7	53.4%
Ethnicity		
White (Northern Irish/British/Irish)	11	84.6%
Mixed/Multiple ethnic groups	0	0%
Asian/Asian British	1	7.6%
Black/African/Caribbean/Black British	0	0%
Other Ethnic Group	8	7.7%

Following the pilot study, minor amendments were made to the OeQ to improve clarity. Within the original questionnaire, all participants were asked demographic questions, followed by general questions about EC use. They were then asked to select a category (outlined below), which describes them the most accurately. Their answers to this question directed them to a specific set of questions made precisely for each category. The pilot work indicated that there was a category missing which would cover smokers who have

tried an EC but had no intention of quitting, so this category was added, further detail and justification of participant categories have been discussed in Section 3.3.1.

The overall structure of the questionnaire was also altered so that participants were categorised first, and the category specific questions and general questions were merged into one section, rather than the general questions and category specific questions existing separately. This was because the pilot found it was common for participants to stop completing the questionnaire after categorisation. Likewise, the questionnaire was also shortened, by removing questions. There were also some specific changes per category, although these changes only included slight adjustments to the wording of questions. The demographic section of the questionnaire remained the same. Following the pilot study, the questionnaire was amended to the final version (final list of questions can be found in Appendix 5). The finalised version of the questionnaire was in English and the responses were stored in Qualtrics³, a web-based application that facilitates online survey data collection.

4.4 Main Study

The finalised OeQ was posted online in October 2018 and gathered 51 responses by January 2019 when data collection stopped. Data collection stopped when a level of data saturation was reached, this was noted when no new additional information was identified and coding was no longer feasible (Guest et al., 2006).

4.4.1 Participants

Due to the nature of this form of data collection, responses can be limited, as the researcher can neither probe for more information nor seek confirmation unlike face-to-face methods (Wright, 2006). Therefore, the researcher aimed to collect around 50 responses to ensure there was enough rich textual data for analysis. Participants were recruited using opportunity sampling, justification for this type of sampling as well as the participant inclusion and exclusion criteria have been discussed and justified in Section 3.3.3 and 3.3.4. The Study was comprised of 18 males (35.29%) and 32 females (62.75%) age ranged between 18-65 with a mean age of 32.4. The demographic variables: gender, age,

³ <https://www.qualtrics.com/uk/>

ethnicity are presented below in Table 11. The percentage of participants in each category is also presented below in Table 12.

Table 11

Summary of Participant Demographic Information for Study One

Demographic Variable	Number of Participants	Percentage of Participants
Age (in years)		
Mean: 32.4		
Range: 18-65		
Gender		
Male	18	35.29%
Female	32	62.75%
Prefer not to say	1	1.96%
Ethnicity		
White (Northern Irish/British/Irish)	32	62.75%
Mixed/Multiple ethnic groups	3	5.88%
Asian/Asian British	8	15.69%
Black/African/Caribbean/Black British	0	0%
Other Ethnic Group	8	15.69%

Table 12

Number of Participants in Each Category for Study One

Category	Choice count	Percentage
(1) I have successfully used an E-cigarette to quit smoking	15	29.41%
(2) I am a smoker who has tried to quit smoking using an E-cigarette but has failed to quit	9	17.65%

(3) I am a smoker who uses E-cigarettes regularly but has no intention to quit	1	1.96%
(4) I am a smoker who has tried E-cigarettes but has no intention to quit	4	7.84%
(5) I have never been a conventional smoker but I use E-cigarettes regularly	3	5.88%
(6) I have never smoked conventional cigarettes or used an E-cigarette	19	37.25%

4.4.2 Procedure

Before the study (including the previously discussed pilot work) began, ethical approval was granted from MMU research ethics committee (EthOS Reference Number: 0487).

Participants were recruited by responding to recruitment media (discussed in Section 3.3.1.2). The recruitment media contained a QR code which, when scanned, would link devices to the questionnaire on Qualtrics.

Once the questionnaire had been accessed, participants were presented with the information sheet, followed by the consent page. Participants could only provide informed consent if they had read the information provided. Once participants had provided informed consent, the first set of questions were displayed which to assessed demographic variables such as age, gender and ethnicity (closed). Participants were asked to create an anonymous ID by inputting the first two numbers of their birthday, the first two letters of their mother's first name. This meant that if they later wished to withdraw their data from the study they could contact the researcher and share this code. The participants then answered a question which classified them into one of six participant categories which have been discussed and justified in Section 3.3.1. Following categorisation, participants were asked category dependent questions. Following the completion of the questionnaire, a debrief screen was shown, which thanked participants for their time, and provided them with the researchers details to contact if they had any queries.

4.4.3 Data Collection

The structure of the questionnaire was as follows: demographic questions were asked, followed by categorisation questions. All categories were firstly asked the same nine general questions (open) which asked about participant knowledge and opinions of ECs. The general section included open-ended questions such as 'what do you think are the

positive effects of using E-cigarettes and why?' Closed ended questions included 'do you think E-cigarettes are addictive?' with a selection of answers including 'yes', 'no', 'unsure', 'it depends'. There were some closed questions (3), these questions were used as 'prompts' in an attempt to encourage participants to think about certain elements of ECs, as they were always followed by an open-ended question asking participants to discuss their answer. The main focus was on the text-entry answer they provided in the open-ended question that followed. The researcher decided to exclude the closed questions from the final analysis and write up as they did not contribute toward answering the research question. Therefore, this study focuses on the qualitative elements of the questionnaire only.

Following the first nine questions, the categorisation was implemented. Each category had a specific set of questions developed, naturally, some questions overlapped although most were category specific. The questions were aimed at understanding EC accounts, including perceptions and reasoning about using or not using an EC, which could eventually translate into key factors that influence behaviour and opinion. The length of the survey was dependent on which category each participant was in (full list of questions can be found in Appendix 5).

- Category 1: 23 items (20 open, 3 closed)
- Category 2: 23 items (20 open, 3 closed)
- Category 3: 22 items (19 open, 3 closed)
- Category 4: 15 items (12 open, 3 closed)
- Category 5: 19 items (16 open, 3 closed)
- Category 6: 14 items (11 open, 3 closed)

4.4.4 Data Analysis

Analysis was undertaken during data collection so the researcher was aware when saturation was complete (Guest et al., 2006). As previously discussed and justified, the closed questions acted as prompts and the quantitative data were not included in the final analysis. The qualitative data were textual and had already been typed by the participants themselves due to the nature of the data collection method, therefore the researcher did not transcribe any data. The qualitative data were organised and uploaded to NVivo Qualitative

Data Analysis Software (QSR International Pty Ltd., 2018). Nvivo is a computer tool for qualitative data analysis, it has been utilised previously in health-related contexts (Woods et al., 2016). Nvivo was chosen as it enhances the transparency of the research meaning that the finding adheres to credibility and confirmability (the importance of credibility and confirmability in research is discussed in Section 3.9.1 and 3.4.4).

TA was employed to analyse the qualitative data; the use of thematic analysis has been justified in Section 3.6. TA is useful for analysing large sets of qualitative data (Braun and Clarke, 2006). This is particularly relevant for the current programme of research, as it consists of 51 individual questionnaire responses, resulting in a large amount of data. Stages of data analysis are presented below.

4.4.5 Stages of Data Coding

A data-driven inductive thematic approach was used to analyse the data. Data codes are the most basic component of raw data (Boyatzis, 1988). Codes were developed in a 'bottom-up' manner in an attempt to capture the main features of ECs accounts. Codes reflected the manifested content of the data (e.g., the perception that EC are safer than CTCs), as well as reflecting meanings that were present at a more latent level (e.g., personal responsibility). The six phases of analysis framework were followed, as proposed by Braun and Clarke (2006) which are presented below in Table 13.

Table 13

Braun and Clarke (2006) Six Phases of Thematic Analysis

Step	Description
1. Familiarise	<p>'Getting to know' the data</p> <p>Listening to audio-recording and transcribing (if necessary), reading, re-reading data, taking notes</p>
2. Generate initial codes	<p>Coding the entire data set – this involves coding any relevant and noteworthy aspects of the data methodologically and thoroughly</p> <p>Eventually a coding frame is developed which can be used in the following step to identify themes and patterns</p>

	(Codes are identified as nodes in Nvivo)
3. Generating themes	Collating codes into broader themes, gathering all the relevant data to each potential theme which can contribute to answering the research question Vague codes can also be discarded at this point
4. Reviewing themes	Checking that the themes accurately represent the codes and data sat, a thematic map can facilitate this (Figure 7)
5. Defining and naming themes	Ongoing analysis to formulate exactly what each theme 'means' and the story it tells, coming up with suitable names that succinctly represent the theme in relation to the research question
6. Writing up	Selecting extracts that are compelling and can answer the research question. Producing a report of the findings and linking them to relevant theory and literature.

4.5 Findings and Discussion

The findings presented below are discussed in relation to the question: 'what are the factors that influence EC behaviour and opinion in adult smokers and non-smokers?'. This section aims to present participants' perspectives on the factors that influence their EC behaviour and opinion, as described by the participants themselves. The discussion will also link elements of participant accounts with theory and wider psychology to provide a more comprehensive answer to the research question.

4.5.1 Thematic Outcomes

Analysis of the data identified four key themes: social context, informative sources, practical aspects and health implications. The clustered themes are demonstrated below in Table 14. Figure 7 also illustrates the overall conceptualisation of the data patterns and their relationships in the form of a thematic map, as suggested by Braun and Clarke (2006).

Table 14

Key themes and Subthemes for Study One

Key Themes	Subthemes
1. Social context	<ul style="list-style-type: none"> • Vaping as a social practice/social connector • Second-hand vapour (SHV) and scent • Social perception and influence • Youth concerns
2. Informative sources	<ul style="list-style-type: none"> • Intention and motivation • Uncertainty and lack of information • Personal experience and shared knowledge • Availability and accessibility • Source credibility and mistrust
3. Practical aspects	<ul style="list-style-type: none"> • E-liquid flavours • Environmental matters • Device issues and cost
4. Health implications	<ul style="list-style-type: none"> • Efficacy as a cessation device • Perceived health benefits and risks



Figure 7 – Thematic Map Illustrating the Relationships Between the Themes and Subthemes from Study One

It is important to note that some extracts were alerted slightly to improve the readability. Typing errors have mostly been removed or corrected unless they are deemed appropriate in regard to the wider discussion around quote. Enhanced information is presented within square brackets. Dotted lines in square brackets at the beginning or end of an extract indicate that the presented response is part of a larger response. Any identifying information has been removed or changed and all participants have been given codes throughout to protect their anonymity. An example of an identifying code would be presented like so: F35W1; this example would refer to the F connoting the participant was female, aged 35, white and in Category 1. Figure 8 provides a visual demonstration to further assist with the interpretation of participant codes. Table 15 provides additional information to assist with interpreting the participant codes.

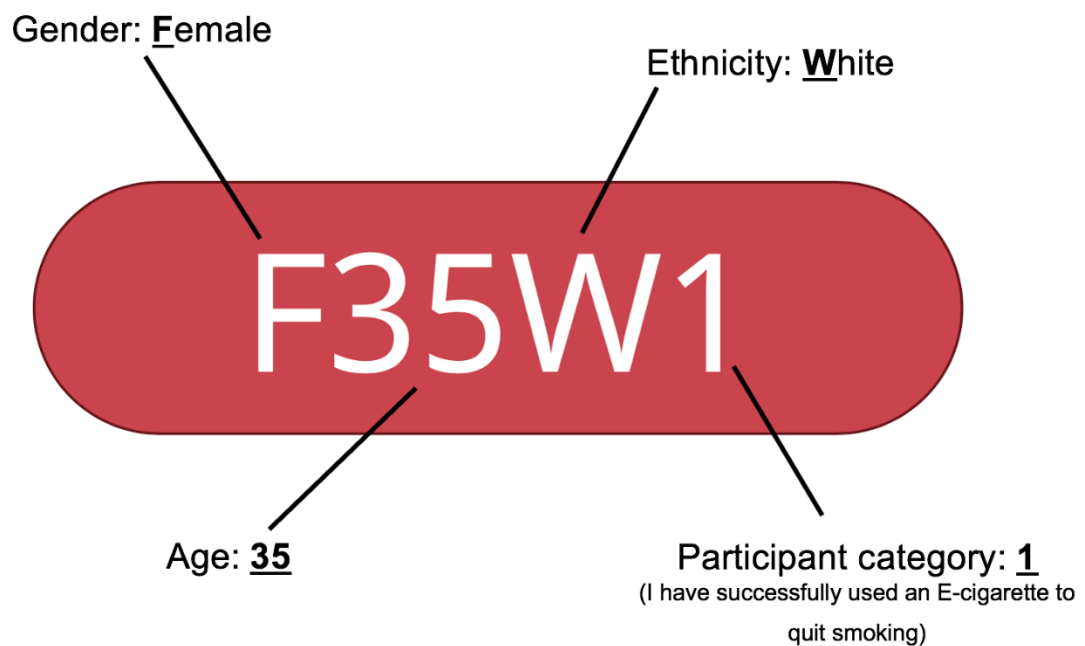


Figure 8 Visual Illustration to Assist with the Interpretation of Participant Codes

Table 15

Additional Information to Interpret Participant Codes

Participant information	Identifying code	Meaning
Gender	F M	Female Male
Age	18+	N/A
Ethnicity	W M AAB BB O	White Mixed/multiple ethnic groups Asian/Asian British Black/African/Caribbean/Black British Other ethnic group
Participant Category	1 2 3 4 5 6	I have successfully used an E-cigarette to quit smoking I am a smoker who has tried to quit smoking using an E-cigarette but has failed to quit I am a smoker who uses E-cigarettes regularly but has no intention to quit I am a smoker who has tried E-cigarettes but has no intention to quit I have never been a conventional smoker but I use E-cigarettes regularly I have never smoked conventional cigarettes or used an E-cigarette

4.5.2 Theme 1: Social Context

Social context as a key theme conveys the social aspects of vaping; how ECs exist in the social environment; how this influences their use; in what way this may affect how they are perceived and whether this acts as an encouraging or deterring factor. Constitutes of this theme are evidenced and highlighted through the following sub themes: i) vaping as a social practice/social connector; ii) second-hand vapour (SHV) and scent; iii) social perception/influence and iv) youth concerns.

4.5.2.1 Vaping as a Social Practice/Social Connector

Smokers and ex-smokers expressed how their initial smoking habit was intertwined with socialising, 'I started smoking a few a day as a social thing [...]' (F24AAB2), 'I smoked because my friends smoked, and I wanted to fit in' (F28W2). In other cases, concomitant with drinking alcohol: 'I would smoke more when drinking' (F23W1), 'I only smoke when drinking' (M29W1), 'I smoke around 6-10 cigarettes a day and almost a full 20 pack on

weekends or when I'm drinking alcohol' (F22O2). Although smoking started as a social activity, in some cases it 'led to smoking during the day' (M29W1).

F24AAB1: I started smoking a few a day as a social thing, it's now a full-blown habit and I could easily smoke up to 20 a day if I'm not careful.

It has been suggested that those who identify as a social smoker are considered a high-risk group in terms of challenges and difficulty facing cessation (Song and Ling, 2011). It is common for these individuals to not regard themselves as 'real' smokers which can often discount the risks associated with smoking (Weinstein, 2005; Schane et al., 2009), meaning they are less likely to quit in the future. One participant emphasised the importance of the social aspect of smoking, and how this prevented him from making sustained quit attempts.

M28M2: What holds me back from a determined and sustained cessation effort is the pronounced and antisocial affective withdrawal symptoms that impact my social and personal functioning to a degree warranting continued tobacco consumption.

Social factors can play an important role in understanding smoking behaviours and therefore potentially EC behaviours (Farrimond, 2016), as in some cases EC use was viewed as social activity.

F23W1: I only really use my e-cigarette when I am socialising with people that also smoke or are drinking as this is the only time I crave a cigarette.

One participant noted that they 'think in my generation they [ECs] have become a social behaviour' (F22W1). Participants that were part of the emerging demographic (category 5) embodied this notion of social and recreational vaping with participants claiming they use ECs 'for fun' (M18AAB5) and 'for leisure' (M21AAB5). One participant expressed the reasons for his EC use in relation to his career.

M19AAB5: Just to socialise and sell. If you don't know anything about a product it's hard to sell. If you know a lot about a product it is easier to sell.

EC use for work purposes could also be understood when looking at the contextual drinking habits of bartenders. One study found that drinking alcohol whilst working behind a bar was

common (Tutenges et al., 2013). Likewise, one study suggests that nearly all employees in a vape shop were current vapers and former smokers (Galimov et al., 2020).

The attraction to vaping because of curiosity and novelty is frequently expressed as concerning due to the potential to induce a nicotine dependency in a non-smoking individual, which could lead them to smoking CTCs to suppress withdrawal symptoms (Henningfield and Zaatari, 2010; Cobb et al., 2015; Etter, 2017). This socialisation element was viewed positively by one participant who noticed that ECs allow people to socialise whilst causing less damage than CTCs.

F24W4: I have many non-smoker friends [...] they have tried cigarettes and are disgusted with themselves – mainly on a night out after a couple of drinks. Some even say they crave them [cigarettes] after a drink despite being non-smokers. They actually do the opposite and buy themselves an e-cigarette to avoid damage to their lungs but be able to join in socially when in the smoking area.

M19AAB1: A friend who also vaped recommended me to try it for a week, ever since then I've stopped smoking.

Smoking and ECs appear to be parallel situational factors that in some cases maintain social connections. In this sense, vaping can act as an alternative to smoking but unlike other quit attempts, ECs users do not have to distance themselves from their existing social networks to avoid relapse. Research has demonstrated that adult vapers place value on the group experience and social opportunities that come with ECs (Barbeau et al., 2013; Keane et al., 2017). One participant claimed they relapsed due to 'influential friends and a smokers circle' (M23AAB2). However, concern was expressed over the negativity of social influence with one participant claiming, 'it's peer pressure' (F34AAB6).

Reflecting on social practices can positively contribute to understanding public health challenges such as smoking, by shifting the focus from the individual as the sole agent of behaviour, toward an understanding that behaviour is a result of the multidimensional interactions between individuals and their social context. EC use as a social connector can be viewed both positively and negatively, in some senses relapse can occur due to associations with smoking and socialisation. Yet, ECs can provide an opportunity to maintain these social connections whilst partaking in a similar but less risky activity.

4.5.2.2 Second-hand Vapour (SHV) and Scent

The difference between the scent of EC vapour and CTC smoke was commonly raised by participants across categories. Generally, participants expressed that they thought the vapour from ECs smelt better than CTC smoke, highlighting: '[they] smell a lot better' (F24W62), 'you don't smell of smoke' (M19AAB5), 'no cigarette smell' (F23W4), 'you don't smell as bad as a cigarette' (M24W3), 'I didn't smell so terrible' (M28M2), '[...] doesn't smell of smoke' and 'good smell' (M19AAB1).

F28W2: My clothes smell less, and I am able to use my EC at home without the worry of any lingering smell.

However, not all participants agreed with this, with some claiming 'they make a lot of smoke' (F60W1), 'they are still unpleasant to passive smoke' (F40M6), they are 'even worse to second-hand smoke [...]', 'it feels too heavy for my lungs and it disgusts me' (F25O6). The opinion of SHV appeared to shape thoughts on acceptability.

F24W6: I think e-cigs are more socially acceptable. As a non-smoker, I have sometimes felt uncomfortable walking past or being near traditional smokers as I really hate the smell and worry that the smell will get onto my clothes and hair, and so I end up worrying about this. When others use e-cigs, I tend to worry less about this as although there is a lot of smoke/steam coming from them, the smells are often pleasant and don't seem to stick around in the air or on clothes for a long period of time like traditional smoke does - or maybe because I don't find e-cig smells unpleasant I don't notice the smell or worry about it [...]

The physical appearance of the SHV was described as 'humongous clouds' (M24M3) that for some can seem 'obnoxious' (M23W3). One participant claimed, 'I joke with my uncle that it makes him look like a dragon when he uses it' (F24W6). The differences in SHV from ECs in comparison to CTCs were sometimes associated with the idea that the SHV was not as damaging and less '[...] irritating for people around me' (F22O2).

M19AA5: They don't smell and don't harm people who are near them due to passive smoking.

Analyses of EC aerosols have found potentially harmful levels of nicotine and oxidants as well as cytotoxic metals such as nickel, silver and copper (Martinez et al., 2014; Saffari et al., 2014; Lerner et al., 2015). In addition, carcinogenic compounds such as formaldehyde and acetaldehyde are also present (Kosmider et al., 2014; Farsalinos and Gillman, 2018). Some suggest that there is a need for legislative interventions to regulate EC use in public spaces to protect those exposed (Schober et al., 2014; Protano et al., 2018). Previous research has also suggested that concerns about SHV are positively associated with policy support (Mello et al., 2015). There is still considerable debate among the public health professionals about the risks of SHV, despite escalating research in regard to the chemical components of EC aerosol (Martinez et al., 2014; Saffari et al., 2014; Lerner et al., 2015). There is a clear need for research exploring public perception of the safety of SHV as it is less documented, especially within the UK.

4.5.2.3 Social Perception and Influence

Perceptions of ECs varied, with one participant claiming, ‘a lot of people think it’s uncool’ (F22O2) and another stating ‘people see it as cool’ (F20W4), one female even claimed she ‘feels awkward using one as smoker’ (F23W4).

M24W3: It seems cool when they blow out some humongous cloud and then spout out information that makes you seem cool in the world of vaping.

There was also evidence that how those around them perceived ECs acted as an influencing factor, participants raised issues about the influence of families on EC related decisions.

F23W4: [...] when I listen to my family, I guess it is influential in the sense that they recommend the use of e-cigarettes and list the benefits. This is an attempt to convert me (a smoker) to use an e-cigarette – mainly for the health benefits.

One participant claimed that their parents would prefer them to smoke CTCs instead of using ECs.

M23AAB2: Parents don’t like seeing their children smoke and when they heard the dangers of ecigs they would prefer me smoking normal cigarettes.

It is well documented that family members are commonly influential in individual social environments, which is known to contribute to the development of behaviour through modelling as well as reinforcement (Hill et al., 2005). Research has demonstrated parental influence has an effect on tobacco use intentions (McCool et al., 2011). It has been suggested that adolescents legitimise parental opinions of substances, emphasising the critical role parents have in shaping expectations of risky behaviours which continue into adulthood (Fite et al., 2018), it is expected that these norms could expand to adult EC use.

One participant spoke about how it is important to reduce the negative stigma surrounding ECs.

M29W1: I believe if it [ECs] was less stigmatised and vaping was not seen as the same as smoking, it would encourage more people to use it. I have had experience of being told by bar/café staff that I was not allowed to vape outside because of the effect on others. I feel more positive research should be published and for legislation to be lessened to allow it to be undertaken indoors.

Feelings of 'self-and-felt' stigmatisation have been previously linked to an increase in motivation to stop smoking (O'Connor et al., 2017; Schoenaker et al., 2018). Soule et al. (2015) also found EC users identify with feelings of stigmatisation which often can deter their use. However, McKeganey et al. (2017) found that smokers felt that ECs have less stigma attached to their use when compared to CTC use.

The reactions of others and how they view ECs contributes toward the factors that impact smokers decisions around reduced harm products (Schoenaker et al., 2018). Some claim that ECs should be less restricted than CTCs and should be accepted in a wide array of settings without users feeling stigmatised. However, the increased visibility of ECs presents a concern that they will normalise smoking.

F40W6: As I am a non-smoker, e or regular cigarettes the issues discussed in the study indirectly affect me, I am anti-smoking from a health (passive smoking and also effects on close family/friends) and cost perspective (waste of money/resources/environmentally) and anti-ecig as I also find it as socially

questionable as smoking, still unpleasant as a non-smoker (marginally less than cigarettes) and it encourages acceptability of drug dependence.

Apprehensions over ECs opposing the denormalisation policy are not uncommon (Vogit, 2015; PHE, 2019). The concern that EC use will renormalise smoking and encourage the acceptability of nicotine dependence stems from the semiotic similarities between ECs and CTCs in their aesthetics, and how they are used, especially among children who may struggle more to see a difference (Vogit, 2015). However, research exploring Welsh primary school children's (age 7-11) awareness of ECs relative to smoking found that primary school children can differentiate. The children in this study had a general awareness of ECs and they understood ECs to be healthier, with some understanding of their role in smoking cessation (Porcellato et al., 2020). Youth concerns are discussed below in Section 4.5.2.4.

The WHO (WHO, 2014) claim that the aim of public smoking bans is to denormalise smoking, but the use of ECs in public spaces may conflict with this agenda. It has therefore been proposed that it is important to divorce the idea of vaping from smoking as in some respects it seems unreasonable that an activity should be restricted simply because it looks like another restricted activity (Vogit, 2015). The increase in availability also heightens apprehensions about increasing nicotine addiction, this has been discussed in Section 4.5.4.4.

4.5.2.4 Youth Concerns

The issue of youth exposure and subsequent use was discussed by some participants, as this is also a commonly explored area due to concerns about future generations becoming addicted to nicotine and eventually turning to CTCs (Conner et al., 2017). Concern was related to the previously discussed idea that ECs act in opposition to the denormalisation policy (discussed in Section 2.2.14), and also that flavours (Section 2.3.4) may entice youths and act as a gateway to CTC use.

M29W1: I also see it as a concern that younger people are beginning to use them under the age of 18.

F18W6: kids use them without even having smoked before. They're just as addictive as smoking. No proof they're actually better.

To counterbalance these concerns, it is important to note that use of ECs among young people (11-18) remains low in the UK (ASH, 2020). Likewise, smoking activities among the youth were apparent, before the introduction of ECs (Centres for Disease Control and Prevention, 2018) and rates of EC use are significantly higher among former and current smokers (ASH, 2020). It is imperative that the general public are aware of information such as this, so these concerns do not dampen any efforts to try and promote ECs to smokers.

E-liquid flavours and whether they have the potential to entice youths have caused a divide among health experts; some argue that these confectionary and sweet flavours which imitate common foods, sweets and liquors may encourage EC use among younger generations (Primack, 2015; Bonhomme et al., 2016; Marcham and Springston, 2017). Others emphasise the importance of the role of flavours in facilitating cessation attempts, as one study found that adults who vape flavoured ECs are more likely to successfully quit smoking when compared to those who use unflavoured liquids (Friedman and Xu, 2020). Additionally, adults who have completely switched from CTCs to ECs are more likely to have initiated EC use with non-tobacco flavours (Russell et al., 2018). Therefore, restricting access to non-tobacco flavoured e-liquids could potentially discourage smokers from switching. Flavours have been discussed in more detail in Section 2.3.4 and 4.5.6.1.

4.5.3 Summary of Theme 1

The social context surrounding the use of ECs materialised as a key theme that influences EC behaviour and opinion in adult smokers and non-smokers. The elements that constitute this theme were related to vaping as a social practice/social connector which conveys the socialisation of past or current smoking behaviours and how these practices are mirrored with EC use. Therefore, this means that particular social environments will act as facilitators or barriers to use depending on the individual and their experiences. The SHV and scent produced from ECs generally acted as an encouraging factor particularly among smokers and ex-smokers. However, the vapour clouds were still noted as offensive by some. Understandably, the increasing exposure of ECs generally lead to concerns about youth usage.

4.5.4 Theme 2: Informative Sources

Informative sources embody how and where individuals get their EC knowledge from, the accuracies of this knowledge, how this contributes to opinion, and whether this encourages or deters EC use. This is evidenced through the following subthemes: i) intention and motivation; ii) uncertainty and lack of information; iii) personal experience and shared knowledge; iv) availability and accessibility and v) source credibility and distrust.

4.5.4.1 Intention and Motivation

Most participants across categories were aware that ECs were most commonly used as smoking cessation devices: '[they are] used to get people off cigarettes mainly' (F46W6), 'used for slowly stopping smoking [...]' (M19AAB2). Even participants that were part of the emerging demographic were aware that in most cases they were 'used for quitting smoking' (M18W5), this is expected as ECs are now the most commonly used method of cessation in the UK (ASH, 2020). Some participants viewed ECs as a prevention tool, to stop smoking initiation i.e., to use instead of CTCs in social situations (previously discussed in Section 4.5.2.1) or to be used by 'people that don't want to start smoking cigarettes [...]' (F22O2).

F23W4: e-cigarettes are electronic devices used as tools to quit smoking for smokers and non-smokers who want to try something other than a cigarette in public.

The use of ECs as a recreational device was also highlighted with some participants claiming '[...] people use it for the fun of it' (M19AAB2) and another discussing 'vape tricks' (M19AAB5). Language such as this promotes the image of vaping as a hobby or 'entertainment or pastime for the smoker' (F25O6), which seemed the most common reason for use among the emerging demographic who claimed they used an EC 'for fun' (M18AA5), 'for leisure and for taste' (M21AAB5) and to 'just socialise' (M19AAB).

Device purpose was related to individual intentions. Ultimately, whether the EC was a cessation device, a recreational device or a complementary device 'depends on the individual' (M18AAB6) and 'their reasons for doing either' (F19AAB6). Likewise, when asked about the efficacy of ECs as a cessation device, some participants highlighted the importance of individual differences (efficacy as a cessation device is discussed in Section 4.5.8.1).

F24W13: [...] if people haven't had a pull towards cigarettes before then they won't have a pull towards this. It's still nicotine, people either want to try it or they won't.

An intention and a 'want' to stop smoking was also important for smokers looking to quit.

F57W1: [...] everyone is different. The only thing I could suggest would be to be in the right frame of mind and want to stop before trying them.

This is understandable as the Theory of Planned Behaviour (TPB; Ajzen, 1991) proposes that the predominant determinant of individual behaviour is behavioural intention, which summarises a person's motivation to perform particular actions (Ajzen, 1991). This also correlates with research suggesting that behavioural control and intention are the best predictor of smoking intention and cessation (Topa and Moriano, 2010). Examining the intentions of users has proved useful to health care professions, to tailor interventions accordingly and provide more customised cessation support to those who are not satisfied with NRT methods (Wackowski et al., 2016).

In a narrative review, it was concluded that the debate of whether vaping perpetuates or attenuates nicotine addiction is dependent on the underlying incentive of whether an individual is motivated to quit or not (Rahman et al., 2015), which appeared to be understood by a female who had successfully used an EC to quit smoking.

F57W1: [...] I know that people have to really want to give up no matter what treatment they get or they will go back to smoking.

4.5.4.2 Uncertainty and Lack of Information

Generally, uncertainty was a major aspect of most participant accounts, although there was a general consensus that ECs were better or the 'lesser of two evils' (Shapiro and Kayner, 2016). Participants across categories recognised them as '[...] much better and safer than smoking' (M55W1); a 'good alternative to smoking [...]' (M27W2); 'potentially harmful but less harmful than regular cigarettes' (F22O3); '[...] better than burning tobacco [...]' (F23W4); 'safer than smoking [...]' (M19AA5); '[...] better for your health than smoking' (F60W6). It is important to point out that there was still a sensible concern that they were not risk free with some participants insisting they are '[...] unconvinced that the vapour is

without risk or consequence' (M28M2) or hearing that '[...] they have harmful substances within them to create the vapour [...]'(M22AAB2).

F23W1: I think they are good for heavy smokers who have had difficulty quitting however I think quitting without the use of an E-cigarette would probably be better because I think we are still unsure of what really goes into an E-cigarette.

As expected, those in Category 6 (non-smokers and non-users) generally claimed to be less knowledgeable about ECs, with some claiming they '[...] don't know a great deal about e-cigarettes[...]' (M24W6) or that they are 'not 100 percent sure on how they work' (F24W6), or even claiming they '[...] don't know them or anything about them [...]' (F60W6). There was also a common concern regarding the long-term effects of ECs with some claiming 'we do not know the dangers yet' (F24W13) and 'of course nobody can truly know long-term effects of using an e-cigarette' (F23W4).

M29W1: At this current moment in time, we do not seem to have steadfast research to suggest the negative effects of vaping, given it is a relatively new idea. I believe there could be extremely negative effects of their use.

This statement mirrors concerns of some health professionals as ECs are relatively new products and therefore available research is limited and standardisation across testing methods is deficient (Lindholm, 2015; Glantz, 2015; Eissenberg et al., 2020).

F24W6: There is some suggestion that e-cigs are less damaging to your health and body than cigarettes but I would like to see more studies coming out properly addressing the effects, as people used to think smoking was good for you in the past, but now we know that the total opposite is true

The uncertainty regarding the appropriateness of ECs is amplified by contradictory stories in the media and ongoing public health debates (Farrimond, 2016; PHE, 2019).

F28W2: I often worry that I am using something that very little is known about and will this be something we look back on in 20 years' time and wonder why we did it knowing what we know.

Participants expressed that the information available is conflicting claiming there is a 'need for more balanced advice' (M45AAB1), more 'explanations regarding health issues'(F57W1), with one participant claiming, 'if there was more knowledge, then more people would use them' (F24W13). One female who had failed to quit smoking using an EC expressed uncertainty, as often information presented in the media was inconsistent, leaving her comprehension to be based on 'guesswork' (F28W2) .

F28W2: I have a limited knowledge of the safety of e-cigarettes as there are often conflicting messages in the media. For example, when I first began using an EC, I read an article that said vaping would lead to 'popcorn lung' and could therefore be more harmful than cigarettes. Since then, the NHS appears to have supported the use of ECs, this is what led me to try ECs again to reduce the number of cigarettes I use. I don't know much about the device other than what I have been told in the stores much of my use of ECs is guess work really.

Due to inconsistencies, limited available evidence, and the blurred line between public health information and bias marketing campaigns making claims with unsubstantiated evidence, it is understandable why some participants felt that if they did wish to seek specific information, they would be uncertain that sources are accurate and trustworthy.

F28W2: Aside from information in stores I wouldn't know where to seek reliable information

It is important for information that is available to be accurate and communicated efficiently to avoid stigmatising ECs, which in turn could prevent smokers from wanting to use them. One participant claimed, 'there were news articles at first stating how dangerous they were' (M23AAB2), which highlights the media's role in creating 'technological stigmas' (Garrrick, 1998). Social stigmatisation has also been discussed in Sections 2.2.18 and 4.5.2.3.\

4.5.4.3 Personal Experience and Shared Knowledge

Personal experience contributed to how some individuals established their knowledge of ECs with one claiming they 'react more to personal experiences rather than information from other sources' (F22O2) and another stating 'only my own observations on the street have informed me and my views' (M65O6). It was common across categories for knowledge to be influenced by those around them who use ECs.

F24W62: Friends. They were cigarette smokers and now they've changed to e-cigarettes. So, I've heard a lot about their experience. Whilst I understand that everyone is different, I do tend to value the information that I have got from them because it's not just what they've said but what I've seen. i.e., they've reassured me that they do not blow up. They explained why they could explode as seen on Facebook. Also, they've had them for years now and nothing bad has happened. I value their experience and opinion.

Peer influence has been discussed in Section 4.5.2.3. Evidence supporting the role of social support in tobacco cessation has been previously discussed (Westmaas et al., 2010; Shruthi et al., 2017).

F57W1: I saw friends managing to quit using e-cigarettes and was sceptical at first but decided to give them a try with my daughter, we set a start date and it was early October and there was a campaign named Stoptober, the 1st October was set as our first day of being non-smokers. The ecig definitely helped and doing it together gave us the extra willpower we needed.

The Transtheoretical Model of Behaviour Change (TTM; Prochaska and DiClemente, 1984) suggests that peer support with the use of experiential and behavioural techniques is most likely to yield better outcomes for tobacco cessation. As a result of shared knowledge between users, unique vaping culture has emerged through peer contact (Tamini, 2017; Notley et al., 2019). The 'peer involvement approach' (Notley et al., 2019), which has been established by listening to the experiences of vapers, has been implemented in some UK stop smoking services (SSS). Post-quit surveys indicate that it is this peer element that contributes to the success of the quit attempt when compared to other attempts (Notley et al., 2019).

4.5.4.4 Availability and Accessibility

As previously discussed, EC popularity and general awareness is on the increase (ASH, 2020). This had not gone unnoticed by some participants noting ‘they’ve become more popular nowadays’ (F19AAB6) and ‘being part of a generation that has seen the rise in their popularity’ (F22W6). Advances in EC technology in recent years was highlighted by one participant who had been vaping for 5 years, ‘I started using an E-cigarette 5 years ago when the tech wasn’t as good as it is now’ (M45AAB1). In some respects, the increase in popularity was convenient for some participants, as ECs could be used in a wider array of places compared to CTCs: ‘able to use in most areas’ (M19AAB1), ‘use them inside’ (F23W4).

Accordingly, this allows some smokers to regain their freedom as they can be used in a wider variety of places, even where the smoking ban is enforced. However, these benefits were tied up with concerns about becoming ‘more addicted and you can now smoke indoors or wherever you want’ (M24W4). Over the last decade smoking has become progressively restricted spatially and, in some respects, socially. Whereas vaping, currently, in the UK is less restricted and can be easily integrated with a range of social practices which can be experienced as ‘spatial expansion and temporal freedom’ (Keane et al., 2017: 6).

F24W6: I think they’re more addicted to e-cigarettes compared to smoking. Because it’s more accessible, doesn’t affect the house/smell bad and it seems less harmful, so I think they ‘vape’ a lot more than they would if they were smoking. This can make them more addicted, or at least more likely to inhale nicotine. My friend has stated that to use cigarettes as a comparison to his e-cigarette habit, he must be smoking the equivalent of 40 a day. It doesn’t stop him though. So, the accessibility and the ‘niceness’ of the e-cigarette, compared to normal cigarettes can make the habit much worse

Concerns about increased nicotine dependence and efficacy as a cessation device is explored further in Section 4.5.8.1.

For some, the accessibility to EC equipment also led to concerns about relapse.

F28W2: [...] when I am unable to buy a particular liquid, or I run out of coils and can only buy them in certain shops which are not close by, this becomes a drag and I resort to just smoking until I can replace the parts needed to carry on vaping.

Limited accessibility to EC products was a concern for another participant.

F28W2: I live in a rural community and there are a few EC shops, all of them require at least a 20-minute drive to reach [...] if I am able to access the store to buy all the parts I needed with ease I would have smoked less and vape more.

The importance of easy access to products in local shops has been noted previously (ASH, 2020). The accessibility of EC products highlights an important risk factor of relapse in regard to smoking.

4.5.4.5 Source Credibility and Distrust

Due to the increase in popularity, some participants also noticed that ECs were 'heavily advertised' (F40M6) and this 'amount of advertising is probably making people pick up the habit' (M24W3). Research has demonstrated that advertising bans, particularly the tobacco display ban, can reduce smoking susceptibility among adolescents, which indicates that placing tobacco out of sight can prevent use (Ford et al., 2019) and that advertising does have a substantial impact on decision making around these products. Therefore, it is understandable that some participants expressed scepticism around the sincerity of specific EC information sources.

M28W2: [...] the marketing strategies employed by e-cigarette manufactures indicate aggressive efforts to appeal to audiences wider than smokers. I'm suspicious of the manufacturers and suppliers' focus on flavour and tastes, as this is of minimal significance to a target population of smokers that have long lost their senses of taste and smell. Granted these senses return and are likely to contribute to their appeal as a cessation aid, but the flavour ranges themselves in many senses are infantilising.

M24W4: Apart from stop smoking services, none of the other options have been systematically paying for advertising to maintain an increase a customer base. The

news are interested simply because it's popular and this is essentially free advertising.

Concern regarding the intentions of manufacturers and suppliers indicate suspicion of the involvement of the tobacco industry in EC marketing. This has been highlighted as a cause for concern in alternative research (Tamini, 2017), which demonstrates a lack of transparency between communication systems. However, in previous research it has been demonstrated that those who perceive devices as safer alternatives to CTCs, are more likely to distrust healthcare providers, doctors, pharmacists and other sources (Case et al., 2017).

M28M2: Academic sources [are the most influential], as more impartiality can be assured [...] E-cigarette retailers and news articles are prone to bias and individuals have taken to providing anecdotal evidence

This is an important social risk that should be explored, as it may reveal deeper moralistic and cultural issues such as the link between the government, public health bodies and the tobacco industry (Tamini, 2017). According to Case et al. (2017), within public health, many harm reduction advocates would argue that the failure to differentiate between industries is a tragedy, as in some cases there are numerous well-meaning EC businesses which have smoking cessation at the centre of their ethos (Ward et al., 2018). It has been suggested as a result of this, that harm reduction campaigns should attempt to effectively integrate communication discrediting industry sources of information and apply non-governmental sources in order to effectively influence EC attitudes and knowledge.

4.5.5 Summary of Theme 2

Informative sources was identified as a key theme in regard to factors that influence behaviour and opinion in adult smokers and non-smokers. The subthemes were related to intention and motivation, which conveys the purpose of the device for the individual and how this affects device perception. Uncertainty and lack of information represents the ambiguity surrounding ECs, although this is not unexpected, as it mirrors the general consensus on ECs across public health, politics, science and academia (Lindbolm, 2015). Personal experiences vary across categories, but the outcomes of these experiences act as an informative source and shape EC attitudes. The increase in popularity and thereby

availability have understandably contributed to the increase in EC use over the years. However, in some cases the lack of accessibility to specialist shops and products act as a deterring factor due to concerns about relapse for smokers. Additionally, there are concerns about increasing nicotine dependence due to less restrictions on where ECs can be used. Finally, source credibility and distrust convey participants' confusion due to the lack of transparency and clarity between credible sources and marketing techniques.

4.5.6 Theme 3: Practical Aspects

Practical aspects as a key theme exemplifies the practical properties of EC devices, the products and paraphernalia associated with them and the environmental issues and concerns that arise as a result of these properties. These are substantiated by the following subthemes: i) e-liquid flavours; ii) environmental matters and iii) device issues and cost.

4.5.6.1 E-liquid Flavours

Participants across categories were knowledgeable that ECs used flavoured e-liquids; 'only information I know of them is that you can buy different liquids/flavours' (M24W6), '[...] there are many different flavours [...]' (M19AAB5), '[...] the amount of flavours [...]' (F23W4), 'nice flavours' (F24AAB2), 'you can get them in various flavours' (M19AAB1). One participant noted the importance of the flavours in smoking cessation.

M19AAB5: As there are many different flavours/liquids people don't touch cigarettes

In regard to smoking cessation attempts, it was common for participants to prefer menthol flavours as it 'closely matches cigarettes' (F28W2), 'most closely resembles menthol cigarettes' (F22O2) or '[...] closest to real cigs'(M27W2). Menthol flavours have sensory and analgesic effects, mirroring some types of tobacco products (Lee and Glantz, 2011), hence why for some it more closely imitates the experience of CTCs, than other flavours per se. Given the recent ban on menthol CTCs, it is of interest to monitor menthol flavour e-liquids to see if there is an increase in use and/or purchase. Sweet/fruit flavours such as 'cakey' (M27W2) and 'mango'(M28M2) also had some appeal, mirroring existing research (Goldenson et al., 2016; Kim et al., 2016).

M23AAB2: Used to use blueberry due to its refreshing smell and flavour as well as other fruit flavours.

There were some concerns about the safety of the liquids: ‘sugary liquids can’t be good for the mouth’ (M45AAB1), ‘some flavours are dangerous [...]’ (M45AAB1). The potential oral effect of ECs has received surprisingly little attention when considering the intimate relationship of tobacco smoke on oral and periodontal health, especially when considering that the oral tissues are the first point of contact for EC aerosols when they are at their hottest and most concentrated (Holiday and Stubbs, 2015; Willershausen et al., 2016). One study has found that EC aerosols have similar chemical properties to high-sucrose, gelatinous and acidic drinks (Kim et al., 2018). E-liquid flavours for those that were part of the emerging demographic were associated with the recreational element of ECs.

M19AA5: Flavours and important it’s fun to test different flavours

Despite their purpose, EC flavour and sensory characteristics were commonly discussed among participants which indicates that they contribute to encouraging or deterring general EC use, which is also evidenced in alternative research (Nonnemaker et al., 2015; Kim et al., 2016). One participant expressed how the contrasts of taste between CTCs and EC aerosols acts as a smoking deterrent.

M24W3: [...] when you try a cigarette after you’ve been vaping for a while it tastes awful, I assume it would taste even worse to someone who’s used to a vape that tastes like cherryaid

One participant was opposed to this.

F24W1: I don’t see the point of flavoured e-cigs. This will surely increase usage of a device as people will like the taste and it will mask the nicotine.

As previously discussed, flavours remain in a controversial position within public health due to concerns about youth use and a potential gateway effect (Pepper et al., 2016), as one participant claimed, ‘flavoured smoke encourages children to try it’ (M27W2). Youth concerns have been previously discussed in Section 4.5.2.4. For these reasons, some countries ban any flavour other than menthol and tobacco (Farrimond, 2017), although these legislations have yet to surface in the UK. There is concern that banning flavours

would jeopardise the chances of certain smokers quitting, as it is believed that some would drop the product if there were limited flavours (Harrell et al., 2017). Research exploring the impact flavour bans in places where they are implemented, indicated that the effectiveness of bans are often comprised by non-compliant retailers (Yang et al., 2020).

4.5.6.2 Environmental Matters

In some cases, participants expressed the positive impacts of ECs on the environment claiming they were 'better for the environment' (F24W4) and they left 'less wastage in the environment' (F20W4). It is understood that cigarette butts are convenient single-use products which are nonbiodegradable and non-recyclable (Novotny et al., 2016). This appeared to be understood by one participant who claimed '[it] prevents cigarette butts on the floor which is better for the environment' (F24W1). One participant was aware of the appropriate way to dispose of the device parts:

F57W1: [...] I dispose of my batteries when they no longer hold a charge in a used battery bin. The tank goes in the general waste.

Some participants seemed less informed with one asking, 'I have no idea how they are disposed of [...] can they be recycled?' (F24W1).

M24W3: I would be interested to know how disposable the supposedly disposable cigarettes are as the battery must contain some hazardous waste.

It has been suggested that ECs may in fact present a more apt comparison to the environmental damage caused by CTCs due to their complexity, as they present a biohazard risk causing an environmental health threat when littered as electronic waste (Chang, 2014). The lithium-ion batteries, electronic circuit boards and endocrine-disrupting plastics require disassembling, sorting and appropriate recycling and disposal (Grant et al., 2013), which is often excluded from their instructions. Some participants expressed concern regarding this matter.

M24W3: None of it is recyclable (as far as I'm aware) which makes me feel pretty awful as I do genuinely care for the environment in most areas of my life – apart from smoking/vaping I guess.

There is limited available information on the environmental impact of ECs (Chang, 2014). Additional investigation is required to clarify the potential environmental impacts of manufacturing which includes the outputs from factories combined with the nicotine extracting methods used. This also includes the environmental impacts of the disposal of EC cartridges containing residual nicotine and devices which contain batteries (Chang, 2014). It is vital for public health regulators to maintain that the devices are being disposed of responsibly and ensure the public have access to knowledge of how to do this, so they can make informed decisions. Health policy debates around ECs should also consider the health of the environment (Grant et al., 2013). The impact of immediate environmental effects, such as SHV are discussed in Section 4.5.6.2.

4.5.6.3 Device Issues and Cost

Practical aspects, such as physical device properties, money and ease of use were important when discussing EC use. Device issues were commonly a deterring factor; one participant described the devices as 'not always reliable, high maintenance, not always available as a smoking option' (M21AAB5). 'Long-battery life' (F55W1) was vital and failure in this often led to relapse as participants felt they were '[...] a lot more likely to smoke [...]' (M23W1).

F28W2: Previous EC devices I have used have not had a long battery life, this has been the biggest most single cause of me ended up buying cigarettes due to not being near home or being able to charge.

For one participant, concerns about battery life also led to anxiety.

M28M2: Battery power was linked directly to withdrawal symptoms and anxiety. To be without the device for as little as two hours was not tolerable, at one stage this led me to buy extra batteries.

Battery life and fast battery charge has been noted as important EC characteristics (Baweja et al., 2015; Yingst et al., 2015). Research has found that those looking to quit smoking commonly begin with a first-generation pen like device and eventually transition to a larger device (Zare et al., 2018). This may be because devices with a higher-powered battery can

deliver nicotine more efficiently (Zare et al., 2018). It has been suggested that the material properties of ECs such as battery life is central to the success of vaping as a practice (Farrimond, 2017).

One participant expressed concerns about the device leaking: 'I find a lot of ecigs leak which put me off using it' (F24AAB2). There were also some apprehensions about the safety of the device parts, with one participant claiming '[there are] a lot of poor quality devices out there that could be dangerous' (F23W4) with batteries which '[...] 'might explode' (F19AAB6).

F22O2: Many people have seen videos of e-cigarettes overheating or exploding and that scares some people.

Previous research has discussed the impact of exacerbated scare stories in the media, with many feeling that such stories were contributing toward public attitudes of vaping more than legitimate public health information (Farrimond and Abraham, 2018). Although these incidents are rare, the cause is unknown, although it appears to be related to malfunctioning lithium-ion batteries (PHE, 2019).

It was also highlighted that the devices didn't '[...] provide smokers with the same satisfied feeling' (F22O2) and they 'weren't satisfied with the mental rush of an e cig in comparison to a normal cig' (M23AAB2). Efficacy as a cessation device is discussed in Section 4.5.8.1. A large influencing factor encouraging smokers to try ECs was the amount of money they were spending on CTCs 'I was wasting a lot of money' (F24W1), 'the cost for me is the most noticeable positive effect of using an EC' (F28W2), 'cost is the big thing, it's why many people want to quit, we are sick of paying for cigs' (M24W3).

M29W1: Given the current price of cigarettes, the price became an issue and I would often buy a packet of cigarettes instead of lunch when I had little money.

Price variations across EC devices when compared to CTCs have an impact on smokers decisions to switch (Liber et al., 2016). This is understandable as generally in the UK, where personal income increases, smoking rates decline, and those with lower incomes are also less likely to try to quit smoking (ASH, 2019). Therefore, the most cost-effective method for cessation is important in order to appeal to these individuals.

M28M2: Although marketed as a cheaper alternative to cigarettes, e-cigarette accessories (batteries atomisers, vaporiser units, liquids) quickly render the mg/mg cost-effectiveness argument unworkable.

The previously discussed device inferiorities eventually led to frequently buying new parts for some participants, meaning the 'cost effectiveness of ECs disappears and cigarette smoking increases' (F28W2). It is therefore important to find a balance between cost without compensating for quality, whilst also ensuring the cost is high enough to deter youth access, as it has been demonstrated that youths are particularly price sensitive in terms of nicotine products (Carpenter and Cook, 2008).

4.5.7 Summary of Theme 3

Practical aspects as a key theme identifies how the practical elements of EC devices are experienced and how this subsequently shapes behaviour and opinion. E-liquid flavours that could most closely resemble traditional CTCs such as menthol or tobacco appeared to be an encouraging factor of use particularly among smokers. However, there was some concern about the general safety of the liquids, as well as confectionary flavours and their potential to entice younger generations and/or never smokers. The environmental impact, such as the physical properties of the device, their disposability and the impact this has on the environment also was of concern, as some participants felt they required more information regarding these issues. Whether this was encouraging, or deterring was dependent on how they viewed the device in comparison to the damage CTCs have on the environment. Short battery life was commonly associated with relapse for smokers and even generated anxiety in others. Device issues sometimes led to relapse for smokers and counteracted the cost-effectiveness of ECs when compared to CTCs, due to continually having to purchase new parts.

4.5.8 Theme 4: Health Implications

Health implications as a key theme constitutes of the health repercussions, both positive and negative, that arise from EC use as part of a cessation attempt, complementary product or recreational product and how these repercussions act as an encouraging or deterring factor. This is evidenced by the following subthemes i) efficacy as a cessation device and ii) perceived health benefits and risk.

4.5.8.1 Efficacy as a Cessation Device

As previously discussed, the most common reason for using an EC was to quit smoking, so naturally the efficacy of a device as a cessation method was frequently discussed. One participant who had successfully quit claimed '[I] tried patches, tablets and chewing gum, e-cig was the only thing that stopped me from smoking' (F55W1). Understandably those who had managed to quit smoking generally had more positive views of ECs.

M45AAB1: Totally effective method that has saved thousands of lives, users are in control of managing their addiction. It gives a closer approximation to smoking than any of the other nicotine replacement, it gives people a chance to see that it is possible to quit cigs [...].

Those who had successfully quit smoking claimed that successful quit attempts were related to reasons such as: 'it helped me get through the cravings' (M60W1). It also gave them a sense of autonomy as one participant felt ' [...] in control of managing my addiction' (M45AAB1). Addiction and control can co-exist with ECs (Keane et al., 2017). This element of control exists in alternative settings, such as methadone treatment programs. The mass availability of e-liquid flavours, variability in nicotine concentration and differentiations across devices further accentuates the sense of control. However, those who had not managed to quit had negative perspectives:

M28M2: E-cigarettes as I see them create a false sense of safety and when coupled with the inability to monitor consumption, a dependency that is difficult to achieve through even the most obscene tobacco use.

Reasons for lack of success included 'it doesn't give regular smokers the nicotine kick' (F22O2), as well as device issues such as battery life, which has been discussed in Section 4.5.6.3. As ECs have rapidly evolved, their nicotine delivery has improved, meaning they may be more attractive to smokers as a replacement (Unger and Unger, 2018). ECs generate an aerosol that penetrates deep into the respiratory tract, which achieves instant absorption of nicotine to the pulmonary venous circulations, mirroring nicotine consumption in the form of CTCs (Sosnowski and Odziomek, 2018). Although this could be viewed positively, this means that potential to become develop a dependency has also increased (Unger and Unger, 2018). Concerns about nicotine dependency was also a deterring factor;

one participant suggested the devices should have specific mechanisms in order to prevent nicotine abuse.

M28M2: An automatic locking mechanism that prevents nicotine flooding/abuse. My latest e-cigarette had such a feature, but it was user controlled and (in my case at least) that seemed to render it inert as a safeguard.

The increased accessibility (discussed in Section 4.5.4.4) also led to some concerns in regard to efficacy as a cessation device. Even for those who had managed to quit smoking CTCs there were still hesitations about the device as ‘not a quitting device more of a replacement’ (M27W2) or ‘adopting another addiction’ (F23W1).

M22AAB2: [...] puts people into the idea of vaping and it reaches a stage where they will always rely on a e-cig and take it as a substitute and not really try and stop completely, as the liquids they put in do contain nicotine and in some cases have a higher dosages than normal cigs.

Although for some CTC consumption may come to a halt, issues about eventually stopping EC use was discussed.

F22O1: I have given up cigarettes but just adopted another addiction with E-cigarettes although it is not as bad as cigarettes, I don’t think I could ever quit both.

Using ECs as a complement rather than a substitute can dampen any benefits of using an EC and make some smokers worse off, as they prolong smoking CTCs and increase their nicotine dependence (Kalkhoran et al., 2015).

M29W1: I think they are credible and a helpful alternative to smoking. However, I have felt since I have stopped smoking and used a vaping device that given their accessibility and ease of use, I can overuse it and often use my device indoors. This is something I never would have done when smoking [...] in my own opinion I will be unlikely to stop vaping anytime soon.

Concerns about increasing nicotine dependence was echoed by one participant:

M28M2: I lost track of my nicotine consumption almost immediately, higher strength liquids/gels were required. In order to reverse the effects, I used nicotine patches for a period of around three months (in conjunction with my return to cigarettes) to prevent mood swings.

Alternative NRTs and ECs are often judged harshly; it appears they can only claim their legitimacy if they eventually completely eradicate nicotine addiction (Tamimi, 2017). However, this approach could be deemed impractical in terms of THR, as the devices are seen to be less harmful and evidence currently available generally supports the cautionary implementation of ECs as a THR strategy, regardless of the intention to maintain EC use or not (Franck, 2016). Even if ECs are adopted solely as substitutes, the rate of health and financial benefits would increase, as well as the rate of cessation for smokers.

Participants also discussed the back-and-forth transitioning between EC use and CTC smoking such as ‘peaks and troughs of not smoking’ (M29W1).

M24W3: [...] I’ve transitioned between vaping and smoking many times before, but then I’ll go to an event like Parklife and buy a pack of cigarettes, have some left over (cause you can’t just buy 10) smoke them, become addicted and the cycle starts again...I’ve definitely had a period of at least 4 months where I don’t smoke though and then I’ve probably quit for a month or two here and there across the years.

Vaping in some respects can provide relief as one does not have to fully declare they are quitting smoking, allowing the ‘success/failure’ narrative that can be commonly experienced when trying to quit smoking to be eradicated. Therefore, allowing individuals to feel less discouraged when they relapse which is a common aspect of the journey toward full CTC cessation (Notley and Collins, 2018). It is estimated that around 2.5% of smokers using an EC in an attempt to quit smoking were successful, whereas they would have failed if they were to have used other forms of quitting support (Wise, 2016). Efficacy has also been linked to individual intentions discussed in Section 4.5.4.1.

4.5.8.2 Perceived Health Benefits and Risks

Smokers and ex-smokers noticed differences from switching from CTCs to ECs: 'my skin improved'(M28M2), 'I can breathe better' (F57W1) and 'more energy' (M45AAB1). One participant claimed they were recommended ECs by a health professional.

M29W1: [...] I unfortunately got diagnosed with lymphoma in 2014. Although I all but stopped smoking because of my treatment, I was prone to smoking still. Vaping was an alternative that I agreed with my oncologist was suitable. Since this point I have gone through peaks and troughs of smoking and not smoking. However, at this moment in time I have not bought a packet of cigarettes since New Years Eve 2017.

These perceived short-term benefits may reinforce use, despite the uncertainty of long-term consequences (uncertainty and lack of information is discussed in Section 4.5.4.2).

Although noticeably beneficial for some, not all participants were convinced. 'A small number of benefits come to mind, but they're outweighed by the negatives' (M28M2), 'bad for health' (M21AAB5), 'possible health risks and addiction' (M18AAB5) and 'I remain unconvinced that the vapour is without risk of consequence' (M28M2).

M22AAB2: I have heard they have harmful substances contained within them to create the vapour once the liquid burns and there were news articles at first stating how dangerous they were, and people were better off smoking.

It is understood that perceived risks play an important role in selecting tobacco products (Hammond et al., 2009). Research should ensure to differentiate between perceived risk and actual negative experience. Given the lack of scientific agreement and uncertainty surrounding the use of devices, means to clearly convey information need to be considered. Given the general discrepancy on the health effects of ECs and the vital role of perception in behaviour, health care providers, health education practitioners, campaign designers and policymakers should remain vigilant when advising on ECs.

4.5.9 Summary of Theme 4

Health implications as a key theme embodies the health-related outcomes both positive and negative of EC use. Efficacy as a cessation device relates to the general success of ECs in helping users quit smoking. Understandably, experiences of this differed across categories

and, depending on the success rate, shaped general attitudes toward them as a cessation device. Perceived health benefits and risks encapsulates the observed changes, both positive and negative, when using an EC. It is important to point out that these changes are commonly associated with short-term use, as at this moment in time long-term effects cannot be established.

4.6 Summary of Key Findings

Social context, informative sources, practical aspects and health implications were identified as key themes in regard to factors that influence behaviour and opinion on ECs in this study. Social context embodies all aspects of the social realm that surrounds individuals and how this moulds their experience of ECs which naturally influences their perception. The social context is understandably shaped by the information absorbed and what this entails. Therefore, how and where individuals gain their knowledge from will act as an encouraging or deterring factor. Likewise, practical and physical aspects of the EC device itself and how users and non-users have experienced this contributes toward their perception, and their experiences of this depending on whether it was positive or negative. The health implications of EC use highlight both the positive and negative effects of ECs and how this compares to CTCs. Table 16 illustrates the specific aspects of the key themes relating to behaviour and opinion. These have been organised into a table of facilitators and barriers of ECs that they can be understood in line with the aim of the thesis.

Table 16

Thematic Outcomes from Study One and Their Role as a Facilitator or Barrier of EC use

Facilitators of EC use	Barriers of EC use
Social context <ul style="list-style-type: none"> • Allowing social connections to be maintained whilst partaking in a less harmful activity than smoking • Recreational purposes/ for fun • Perceived as having a better scent and less damaging SHV • Encouragement from those around them to use 	Social context <ul style="list-style-type: none"> • Perceptions of feeling stigmatised • Discouragement from those around them
Informative sources <ul style="list-style-type: none"> • Honest intention to quit smoking 	Informative sources

<ul style="list-style-type: none"> • Less restrictions on where ECs can be used in comparison to CTCs • Accessible and trustworthy sources of information 	<ul style="list-style-type: none"> • Distrust due to confusion between honest informative and bias marketing techniques • Lack of physical accessibility to shops selling ECs and associated products
Practical aspects <ul style="list-style-type: none"> • Cheaper than smoking cigarettes • Tobacco and menthol flavours mimicking CTCs and assisting with cessation • Less cigarette butts on the floor 	Practical aspects <ul style="list-style-type: none"> • Short battery life leads to relapse • Parts can break regularly which makes cost effectiveness argument unfeasible • Concerns about safety of flavour liquids • ECs as a biohazard when disposed
Health implications <ul style="list-style-type: none"> • Less harmful than cigarettes • Aid to quitting • Noticed positive changes in health from switching such as, skin improvements, more energy and so forth 	Health implications <ul style="list-style-type: none"> • Inducing/increasing nicotine dependency

4.7 Conclusion of Chapter 4

Overall, this chapter has identified a number of findings which are reflective of the factors that influence EC behaviour and opinion. This study demonstrates the variability of EC experiences, participants presented varying accounts of ECs, suggesting that individual narratives regarding ECs are multi-faceted.

Strengths of this study were that participants were detailed in their responses and shared a large amount of information. The anonymity of the process enabled this level of disclosure. This study also broadened the participant pool by accessing participants from a range of ages, genders and ethnicities. The study was written up for publication and published in *The Journal of Health Psychology* (Wilson et al., 2020), meaning it has gone through several stages of peer review.

There were undeniable limitations to the study. As previously discussed, there are limitations to how much participants can express themselves when undertaking the online

OeQs, as the researcher can neither probe for more information nor seek confirmation unlike face-to-face methods (Wright, 2006). Accounts are also from participants from the UK so it is uncertain how far these responses would transfer to others outside this area. There are disadvantages to the opportunity sampling (explored in Section 3.3.1.1), as it is not random and can therefore lead to bias (Emerson, 2015). Socioeconomic status (SES) was also not explored in this study, which is limiting, as previous research has demonstrated it has been linked to differences in perceptions of ECs (Hartwell et al., 2017; Green et al., 2020). There were also conceptual challenges such as self-categorisation; there is a possibility that participants could self-identify incorrectly due to social expectations, this has been discussed further in 7.8. Although participants in this study varied in ethnicity and there were no defined exclusions, participants largely identified as white, so it is uncertain how far these responses can transfer to other ethnicities.

This study implicates that future research should continue to explore the social practice, including perceptions of SHV that surround vaping behaviour to provide more effective ways of understanding and conceptualising attitudes toward ECs, as well shifting the focus from individuals as the agent of behaviour, toward alliances between EC behaviour and social practices. There is a need for more transparency between communication systems. It is important for information that is available to be accurate and communicated efficiently to avoid stigmatising ECs, which could prevent smokers from wanting to use them, whilst also ensuring non-smokers are deterred from using them. Harm-reduction campaigns should ensure that it is clear when information comes from credible sources or is a form of marketing to accurately influence EC attitudes and knowledge. It is important to find a balance between cost efficiency without compensating for device product quality, whilst also ensuring the cost is high enough to deter youth access. The most cost-effective method for cessation is important for public health gain. The accessibility of EC products highlights an important risk factor of smoking relapse. Future harm reduction policies could consider ways to make ECs and associated paraphernalia even more accessible. It is also vital for waste disposal authorities to maintain that the devices are being disposed of responsibly and ensure the public have access to the knowledge of how to do this, so they can make informed decisions. Health policy debates around ECs should consider the health of the environment.

4.8 Chapter Summary

This chapter used an OeQ method to explore the factors that influence behaviour and opinion in adult smokers and non-smokers. Influencing factors are related to social context, informative sources, practical aspects and health implications. These thematic outcomes were used to develop an interview schedule for the following study. The following chapter will seek to build upon the understanding of the key factors that influence attitude and opinion in adult smokers and non-smokers accounts of ECs using SSIs to explore the factors that encourage and deter use.

Chapter V – Study Two: What are the factors that encourage and deter EC use in adult smokers and non-smokers?

5.1 Introduction to Chapter

Chapter 4 identified that the key factors that influence EC behaviour and opinion in adult smokers and non-smokers are related to social context, informative sources, practical aspects and health implications. The study discussed in the previous chapter was designed to generate an abundance of accounts, although due to the online questionnaire format, responses may have been limited. Therefore, Chapter 5 aims to use an SSI method to probe individual accounts of ECs, providing an alternative insight into EC perception that would not be captured using the OeQ method. This chapter will present an overview of the methodology, results, and a general conclusion of this strand of the thesis, which explores the research question: ‘what are the factors that encourage and deter EC use in adult smokers and non-smokers?’.

This study has been accepted for publication in *Psychology & Health*:

Wilson, G. Keenan, J. Grogan, S I. Porcellato, L. S. Powell, and Gee, I. (2021) ‘An Investigation of Factors Encouraging and Deterring E-cigarette use: A Thematic Analysis of Accounts from UK Adults’. *Psychology & Health*.

5. 2 Method

5.2.1 Design

A qualitative research design was utilised using SSIs, justified in Section 3.5. SSIs were conducted with a range of participants across categories (discussed and justified in Section 3.3.1.2). Twelve semi-structured interviews were completed in total with interviews ranging between 29 and 58 minutes in length.

5.2.2 Participants

The original aim was to conduct around 10-15 interviews, with two to three participants from each participant category (description and justification of participant categories can be found in Section 3.3.2), as research suggests this is would ensure saturation of themes for all accounts (Creswell, 2002). Participants were recruited using opportunity sampling,

inclusion and exclusion criteria are discussed and justified in Section 3.3.1.2. Recent work by Braun and Clarke (2019) suggests that meaning is generated from interpretation rather than the number of data items, and therefore when to stop data collection is subjective and cannot be fully determined prior to data analysis. Guest et al. (2020) similarly advocates for flexibility and transparency in assessing and reporting on saturation in thematic analysis. The stopping point for an inductive study, such as the current study, can be determined by the judgement and experience of the researcher. Therefore, data collection stopped when saturation was reached across the whole data set and no new codes were identified. Although participants were chosen purposively because they had varied smoking/EC experiences, the intention was not to compare groups by reaching theoretical saturation for each group. Instead, the intention of the analysis was to produce a thematic model that accounted for all accounts. Therefore, recruitment occurred until a level of data saturation was reached (Guest et al., 2006), this occurred when further coding was no longer feasible (Guest et al., 2006). In total there were 12 participants, age ranged between 23-55 with a mean age of 32.45. It is important to make clear that there was no overlap in terms of participants. Summary of participant demographics are illustrated below in Table 17. Full details of participants, including their participant category are illustrated in Table 18.

Table 17

Summary of Participant Demographic Information for Study Two

Demographic Variable	Number of Participants	Percentage of Participants
Age (in years)		
Median: 32.45		
Range: 23-55		
Gender		
Male	5	41.66%
Female	7	58.33%
Ethnicity		
White (Northern Irish/British/Irish)	12	100%
Mixed/Multiple ethnic groups	0	0%
Asian/Asian British	0	0%

Black/African/Caribbean/Black British	0	0%
Other Ethnic Group	0	0%

Table 18

Details of Participant Characteristics from Study Two

Pseudonym	Age	Gender	Category
Michael	25	M	(6) Never smoked conventional cigarettes or used an E-cigarette
Bob	30	M	(6) Never smoked conventional cigarettes or used an E-cigarette
Beth	27	F	(5) Conventional smoker who uses E-cigarettes regularly
Eve	23	F	(4) Smoker who has tried E-cigarettes but has no intention to quit
Rose	54	F	(3) Uses E-cigarettes regularly but has no intention to quit
Daniel	25	M	(3) Uses E-cigarettes regularly but has no intention to quit
Leanne	31	F	(2) Tried to quit smoking using an E-cigarette but has failed to quit
Carol	50	F	(2) Tried to quit smoking using an E-cigarette but has failed to quit
Tom	35	M	(2) Tried to quit smoking using an E-cigarette but has failed to quit
Paul	22	M	(1) Successfully used an E-cigarette to quit smoking
Tracey	55	F	(1) Successfully used an E-cigarette to quit smoking
Debbie	45	F	(1) Successfully used an E-cigarette to quit smoking

5.2.3 Procedure

Before participant recruitment, ethical approval was granted from the MMU research ethics committee (EthOS Reference Number: 8766). Participants were identified by responding to the recruitment media (discussed in Section 3.3.1.2) and emailing the researcher to express their interest. Prospective participants who responded with a declaration of interest

were sent an electronic version of the information sheet to be fully informed of the study before agreeing to consent.

Upon receipt of agreement from participants via email, the researcher and the participant agreed a time, date and location for the interview to take place. Care was made to be as flexible as possible with regards to the timing and location of the interview out of respect and gratitude for participants' time. Acknowledgement of the appropriateness of the location needs to be considered in the interviewee's comfort (King et al., 2018). The interviews were conducted at various locations, typically the university campus but sometimes other (public) locations, if this was more accessible to participants.

Participants were asked general questions to build rapport before the interview started. Before commencing with the interview, the participants were given a physical copy of the information sheet and were provided with the option of re-reading it before providing informed consent. It was reiterated that participants were not obliged to answer all interview questions and that they could leave at any point without providing an explanation. Participants were also informed that involvement was voluntary, any views expressed during the interview would remain confidential, but they were reminded that the interview would be audio-recorded, transcribed and possibly included anonymously within the thesis and a published journal article. Participants were afforded the time to ask any questions which they may have about the interview. Once these questions had been answered, the participant provided their informed consent both in writing and verbally. After participants had provided informed consent, they were provided with a demographic information sheet (example of a demographic information sheet can be found in Appendix 6) to complete, as well as a sheet containing a list of the participants categories by which they were asked to self-identify. Upon their approval, and the completion of the demographic and self-identification form, the interview commenced, and the researcher began to record the interview using a Dictaphone. Following the conclusion of the interview, participants were thanked, de-briefed reminded of their right to withdraw and also that their data would be removed from the analysis and if they chose to do so. No participants asked to have their data withdrawn from this study.

5.2.4 Data Collection

The data were collected between March 2019 and December 2019. The researcher conducted individual SSIs with participants. The same pre-determined interview schedule (Appendix 7) was used by the researcher during each interview, this was important in ensuring rigour as all participant interviews followed the same structure. However, not all questions were relevant to all participants, due to the categorisation element. The SSI schedule was therefore broad and clarified which questions should be asked depending on which category the participant identified with. A pilot interview was conducted to test the suitability of the interview schedule, pilot interviewing is advocated by many researchers (Gray, 2014; King et al., 2018). No modifications were made to the schedule as a result of the pilot interview, as the researcher felt comfortable that the existing questions enabled proficient exploration of EC accounts required for the aims of the study.

The first section of the interview focused on predominantly introductory questions. The aim of this section of the interview was to build trust and rapport. It also allowed the participant to disclose the category they identify with and explain the context of this identification. The researcher then went on to ask questions such as ‘can you tell me about the first time you tried/noticed an EC?’. The interviews then progressed to discuss more specific elements of ECs, such as factors that influence EC opinion as identified from Study One. This included asking questions about social context ‘has anything someone has told you influenced your opinion on ECs – if so what was it?’, informative sources, ‘where do you think is best place to get trustworthy and reliable information about ECs from and why?’, device practicalities, ‘what type of device/liquid do you use and why?’ and health implications ‘have you noticed any changes in your health since using an EC? If so, what are they?’.

The interview concluded with the researcher asking some reflective questions to the participant about the process of the interview such as ‘what do you think are the key issues we have discussed today?’. Participants were also invited to provide any additional information which had not been covered.

5.2.5 Data Analysis

All interviews were transcribed verbatim by the researcher within two to five days of the interview occurring. Transcripts were anonymised to protect the identity of participants both during and following the analysis process. As all interviews, transcription, and analysis were

undertaken by the researcher, this meant they were deeply familiar with the data analysed. Researchers who transcribe their own interviews can learn more about their interviewing style and the stated meanings of participant talk (Kvale, 2007). The recordings were listened to more than once, ensuring there were no misinterpretations of words, or major typing errors. Although, the real-life interview can never be fully accessed on paper, the researcher wanted to ensure that the transcript represented real life as much as possible. Therefore, long pauses, laughs, or sounds that impacted on the tone of the conversation were described. Line numbers were also used to assist the interpretation, as they provide contextual information about participant responses so it can be understood whether their comments were a direct response to questioning, or a naturally occurring statement. Enhanced information (e.g., to explain the context of the quote) is presented within square brackets. Dotted lines in square brackets at the beginning or end of an extract indicate that the presented response is part of a larger response. Participant pseudonyms are also followed by their category in round brackets and line numbers in square brackets.

The transcripts were analysed using inductive TA (Braun and Clarke, 2006) on NVivo Qualitative Data Analysis Software (QSR International Pty Ltd, 2018). Justification for the use of Nvivo can be found in Section 4.4.4. The steps to TA that were followed as recommended by Braun and Clarke (2006) can also be found in Section 4.4.4. In a similar manner to Study One the analytical strategy was inductive and data-driven at the latent level (Willig, 2013). Transcripts were initially read, and notes were made alongside. Unlike the data from Study One, the interviews could be listened to repeatedly, whilst transcripts were also being read. Transcripts were re-read multiple times, and coding was iterative and cyclical, the stages of data coding that were discussed in Section 4.4.4 were followed. Coding facilitated the organisation of the data into meaningful groups (Tuckett, 2005). The data were coded for content relating to factors that encourage and deter EC use in smokers and non-smokers. The codes were based on patterns within the data, these were then collated into the key themes with a focus on the identification of the salient themes that appear across all responses (Boyatzis, 1998; Willig, 2013). Codes and themes were deliberated with the first supervisor, revised, and validated by all five members of the supervisory team.

A thematic map (Figure 9) visually demonstrates the data patterns and their relationships as recommended by Braun and Clarke (2006). It also guided the researcher in to grouping

the subthemes into key themes. Following the success of this, individual theme validity was considered, by contemplating the accuracy of the thematic map and its representation of the whole data set whilst also re-coding the data in order to code for any data that could have potential been missed in the early coding stages. Although Braun and Clarke's (2006) steps are presented as a linear process, the analysis was an iterative, circular and reflexive. Stages of data collection and analysis were undertaken simultaneously to ensure that the developing themes were grounded in the data. This interactivity is described as 'goodness' in qualitative research (Tobin and Begley, 2004).

The clusters of meaning generated from the analysis were eventually organised in to four key themes. Some themes overlap with others due to the way particular ideas surfaced across the complete data set. It is recognised that these themes are only reflective of the analysis and it is impossible to cover all aspects of the 12 participant accounts. Similarly to Study One, the researcher was aware that the finished analysis was only consistent with a part of the data set and is supported by the selected examples that have been chosen to support the point that has been made (Silverman, 2006). The themes and subthemes reported below in Section 5.3 are one of several ways in which the findings from the analysis could have been organised and presented. The final themes were decided upon because of their capacity to answer the research question and accurately represent the data set. In the extracts presented below, participants names have been replaced with pseudonyms to protect confidentiality.

5.3 Findings and Discussion

The findings presented below are discussed in relation to the question: 'what are the factors that act as facilitators and barriers for EC use in adult smokers and non-smokers?'. Using data from 12 SSIs, this section aims to present participants overall perspective on the factors that encourage and deter EC use as described by participants themselves. The discussion will also link ECs with theory and wider psychology to further understand the role of ECs for these individuals and how and why these stances may differ.

5.3.1 Thematic Outcomes

Analysis of the data identified four overarching themes: (1) social context; (2) representation and knowledge; (3) aspects of addiction; (4) device related issues. The key themes and their subthemes are demonstrated below in Table 19. Figure 6 below also

illustrates the data patterns and their relationships in the form of a thematic map (Braun and Clarke, 2006).

Table 19

Key Themes and Subthemes for Study Two

Key themes	Subthemes
Social Context	<ul style="list-style-type: none"> • Norms and Influence • Situationally Dependent • Binding the Social and Legal Horizon
Representation and Knowledge	<ul style="list-style-type: none"> • Communication • Uncertainty • Importance of Education
Aspects of Addiction	<ul style="list-style-type: none"> • Intentions • Behavioural-Sensory • Position as a cessation device
Device Related Issues	<ul style="list-style-type: none"> • Health and Risk • Device Functionality • Convenience

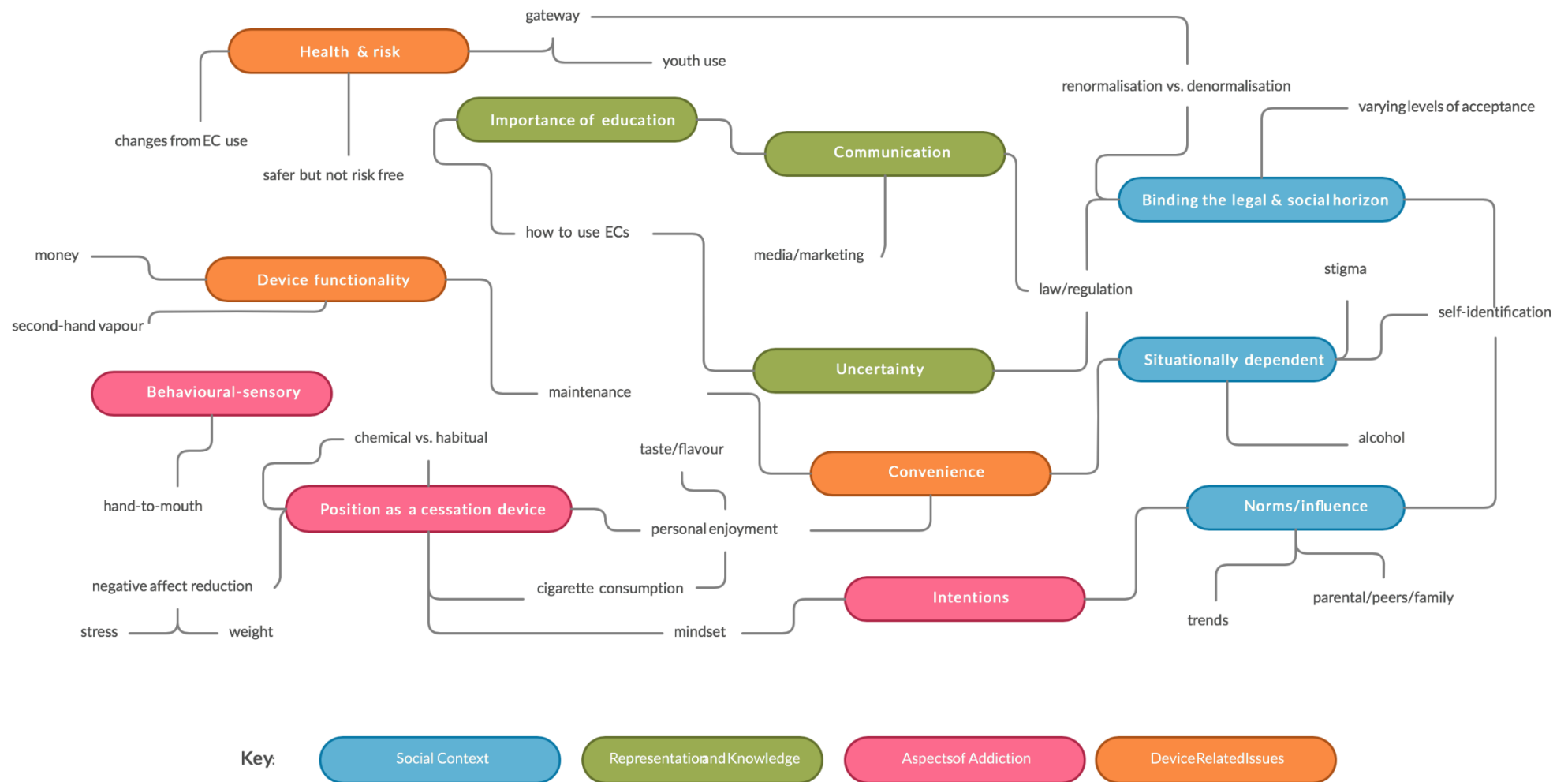


Figure 9 -Thematic Map Illustrating the Relationships between Key Themes and Subthemes for Study Two

5.3.2 Theme 1: Social Context

Social context was constructed through participants' explicit accounts of how external social interactions impacted their EC experiences. This key theme conveys the social norms surrounding EC use; how the situational context influences use and how the blurred line between social and legal acceptability influences use. Elements of this theme is evidenced and highlighted through the following subthemes: i) norms and influence; ii) situational dependence and iii) binding the legal and social horizon.

5.3.2.1 Norms and Influence

These data suggest that approval from friends, family, and society (i.e., injunctive norms) were important in decision making surrounding ECs. For one participant, EC initiation was related to the 'creeping social pressure' (Debbie (C1) [76]) to quit smoking. For Paul, Tom and Tracey, a family member introduced ECs in an attempt to prevent them smoking CTCs.

Paul (Category 1) [92-95]: [...] my brother was a former smoker and used to smoke 20 to 25 a day and he said 'well look Paul, well y'know if you look what I've done I've quit and I'm on the e-cigarette now [...] you don't get the poisonousness tar going through your blood stream and all the chemicals in cigarette that you would in a vape' so he introduced me to one, so I never really looked back [...]

Tom (Category 2) [171-172]: [...] my dad this time was very keen to stop me smoking so he said 'I'll buy you one, I'll buy you an e-cigarette' [...]

Tracey (Category 1) [80-82]: [...] I said to one of my daughters before I came home [from the hospital] 'I really don't wanna smoke' and she said, 'well don't' and I said, 'I won't but I'm worried in case I'm tempted' and she said, 'well why don't you try one of those e-cigarettes?' [...]

This demonstrates how for these participants, outsider perception was influential in their decision to use an EC, and also that ECs were perceived more acceptable than CTCs by these family members. Alternative qualitative studies have also highlighted that being advised and/or supported by peers and family to use ECs as a cessation device, is

influential in initiating use (Pepper et al., 2014; Coleman et al., 2016; Wadsworth et al., 2016; Tamini, 2018). Perception of increased social standing has been noted as an important component of EC use among adults in general (Hershberger et al., 2017), this was noticed in Daniel's case:

Daniel (Category 3) [106-112]: [...] when I first decided to get one it was somebody at work had one, cos of the job, it's at a solicitors, the kind of perception its – not perception but if somebody was coming in to the office – cos I noticed it myself on a friend who did smoke you could really smell the cigarettes on them when they came in [...] and then somebody got an e-cig and they had that so when they would go out I'd see them have the e-cigarette, it was more of a discussion they would say they preferred it and then were trying' to quit when they had it, so, I kinda tried theirs a few times and then when I noticed they had quit with it I was like yeah I think I might get it [...]

Social influence affects decision-making around CTC initiation (Christakis and Fowler, 2008). Previous research has discussed the social influence and norms surrounding CTC use (Alamar and Glantz, 2006; Brown et al., 2009) and more recently, EC use (Coleman et al., 2016). When Rose was asked about motivations for youth use, she highlighted beliefs around the impact of social influence on use:

Rose (Category 3) [373-374]: [...] there will be a reason that they [youths] are going for the e-cigs, being part of a gang, looking cool, seeing the parents do it, all the same reasons I picked up a cigarette 40 years ago [...]

For Tom, the social elements of the CTC experience were an important aspect of his addiction, and ECs could never truly mirror this experience, which may potentially be why he relapsed back to CTCs.

Tom (Category 2) [147-150] : [...] it's [ECs] not the same and the more time you miss - not the physical but more so the habitual - you miss going down with your friends at break time, you miss everyone else in your group going out for a fag when you're in the pub or in the nightclub and your sat there thinking this [EC] doesn't feel like a cigarette [...]

This opposes findings from an alternative study whereby social facilitation was described as an advantage of ECs, as users were still able to participate in traditional social smoking circles with an EC, and even felt that vaping was actually more social than smoking (Harrell et al., 2019). The habitual element of addiction is also discussed in Section 5.3.6.2.

Social group identity is a dominant force in the maintenance of wider social norms (Tajfel and Turner, 2004). Therefore, it is understandable that elements of EC understanding relating to social norms shaped participant beliefs about their identity, as social norms in this sense, establish the socially acceptable attributes of an individual identity (Lipari, 2018). In recent years, the social connotations surrounding smoking have transformed from a glamorous, appealing habit to an offensive addictive behaviour (Farrimond, 2006; Bell et al., 2010; Graham, 2012) making it a 'non-socially acceptable' attribute of identity. This may have been why there were some contradictions in regard to participant self-categorisation and the behaviour they discussed.

Leanne (Category 2) [9]: [...] I've never been a heavy smoker, I'm still not a heavy smoker [...]

Likewise, Daniel, never identified as a smoker, although his account presented otherwise:

Daniel (Category 3) [125-127]: [...] when I was at university I always said to myself 'oh I'm not a proper smoker' and I'm gonna stop after uni and then uni finished... and then I just sort of carried on [laughs] I guess now I wouldn't say I'm a proper vaper either....maybe I just don't admit to anything [laughs] [...]

Dual use can complicate smoker identity, depending on individual conceptualisations of ECs, and where they place themselves in regard to other smokers and vapers. Evaluations of CTC and ECs usage were usually discerned, meaning the identity categories 'smoker' or 'vaper' appeared mutually exclusive. This may potentially explain why Daniel identified as neither. Bob, who identified as a non-smoker admitted he previously socially smoked:

Bob (Category 6) [10]: [...] I've never fully smoked – I did a bit of social smoking I guess is the best word for it, you know in my earlier twenties [...]

This echoes previous research which proposes that smoker identity does not have exclusive categories. Instead, there are a range of smoking identities that are multi-faceted (Tombor et al., 2015). Some research suggests that a strong smoker identity can inhibit cessation attempts (Nelson et al., 2015), this appears evident in Debbie's account. Debbie expressed that during alternative quit attempts (not including when she started using her EC), even when she wasn't smoking, she still identified as a smoker:

Debbie (Category 1) [20]: [...] I could make myself not smoke but, in my head, I was still a smoker [...]

The 'vaper' identity can offer an alternate identity possibility (Barbeau et al., 2013; Notley et al., 2018).

Debbie (Category 1) [30]: [...] they just really fit with me incredibly well they're just like this perfect solution – and I don't feel like I'm missing out as a smoker I feel like I've upgraded to something better, it's better to be a vaper [...]

Commonly, cessation attempts endure multiple cycles of quitting and relapse before permeant abstinence is achieved (Witkiewitz and Marlatt, 2004; Gökbayrak et al., 2015), this was particularly the case for Debbie (C1) and Tracey (C1) before they were introduced to ECs. The 'stages of change' from the TTM can be reflected on here as it is understood that behaviours do not change quickly and decisively. Behaviour change is cyclical, rather than a linear process (Prochaska and DiClemente, 1984). Reflections on concepts of the self could also be considered when regulating smoking transitions. Appreciating the benefits of cutting down rather than quitting all together can also promote a more positive self-image. It is therefore important to view smoking identities as non-exclusive. Future research should focus on how ECs interrupt and become integrated in these identity cycles and how this impacts nicotine, particularly CTC addiction.

5.3.2.2 Situational Dependence

Dual users (Category 3) in particular, demonstrated the impact of situational context on the use of ECs. In this instance, the situation they were in influenced their decision to smoke or use their EC.

Daniel (Category 3) [182-184]: [...] I'll just go to the shop buy some cigs, and it's almost like, I'll smoke and then I'll have my e-cig sometimes whilst I'm revising, but then I'll break up my day by going out for a cigarette [...]

Rose (Category 3) [161]: [...] it was in the car, so I had it [ECs] in the cos' I don't smoke in the car, so I would use it then [...]

Previous research has also demonstrated that dual users' use of CTCs or ECs is influenced by places and/or situations (Pokhrel et al., 2015). Alcohol induced states and situations affected EC use for one participant:

Beth (Category 5) [60-61]: [...] if go out on a weekend, I do tend to use it [EC] more like if I've had a drink, I tend to do it all night continuously and in the morning, I can feel it on my chest [...]

Previous research has demonstrated a well-established relationship between nicotine (in CTCs) and alcohol. These data suggest that nicotine in ECs may have similar effects, this may potentially be the case for Beth who had never previously been exposed to nicotine:

Beth (Category 5) [85-88]: [...] my boyfriend has said when I have had a drink and I didn't have my vape I asked him for a cigarette, I mean that was when I was really drunk apparently, I mean I can't remember, I don't think I would ever do it and maybe if I tried it – the cigarette – I don't think I would enjoy it [...]

It could be suggested that Beth's exposure to nicotine in an EC has potentially created a physiological pathway to repeat use, and in situations when nicotine in the form of EC is not available, she sought CTCs when under the influence of alcohol. Preliminary evidence also supports the notion that EC use, and alcohol consumption may influence each other (Hershberger et al., 2016).

Debbie had a variety of EC devices, and would switch between them depending on the social situation she was in:

Debbie (Category 1) [107-110]: [...] well you've got like those sorts of devices which to me are my little stealth work one that won't give out much vapour because it's got the erm PG in it instead of the VG and the like a lower wattage, higher nicotine, so they're like your stealth device but when you're at home you use your other one which you get big clouds with and all the rest of it [...]

In 2019, 27% of EC users claimed to use more than one device (ASH, 2020), however the reasonings behind this are unknown, future research could explore this. Similarities can also be drawn in the from the previously discussed study that suggested that situational context is important for dual users when making decisions whether to smoking a CTC or use an EC (Pokhrel et al., 2015).

5.3.2.3 Binding the Social and Legal Horizon

Social norms and perceived social acceptability were understandably shaped by the regulations and law surrounding ECs. Naturally the discussion of social acceptance brought up dialogues about current regulations. One participant felt the regulations were not strict enough:

Paul (Category 1) [292-295]: [...] I think more regulation needs to be put in place, more industries and corporate businesses need to start commercialising them as a means to – for young children and adults to get them on to them, to cut down [CTCs], and put more age restriction on them as well [...]

Many participants perceived the scarcity of research and the ever-changing regulations as a barrier to social acceptance and use:

Debbie (Category 1) [187-188]: I still think in legislations there's a bit of a judgement because I think y'know TPD and the maximum two millilitre in your little thing there's a bit of a judgement thing isn't there [...]

Some research has suggested that aspects of EC use appear to provide a way of escaping the social stigma of being a smoker, as in one study users began to view themselves as 'healthier' and felt they were no longer posing threats to others (Thirlway, 2016). Although for some (Debbie), this can prove disappointing as the exhaustive debate concerning ECs continues. Voigt (2015) claims smoking and vaping should be viewed as distinctly different activities as the visibility of vaping renormalises vaping not smoking. One participant agreed with this:

Daniel (Category 3) [258-259/260-261]: I think that it should be more lax, like I know there's people in my work - cos there's people that sit at the desk and sneakily have a puff [...] if that was allowed or there was a little area where it was like 'oh you can use your e-cig in here if you want' I think that would be really good I think some people wouldn't probably smoke if there was more public places where you were allowed them [...]

This is understandable as decision-making in regard to EC use has been shown to be affected by contexts where the use of CTC is forbidden by law (Vandrevala, 2017). From these data, the fluctuating regulations appeared to be difficult to follow which may contribute to uncertainty (discussed in Section 5.3.4.3).

Leanne (Category 2) [240-244]: [...] what I've read on them is that they don't do any harm, but then we've been told that weren't allowed them at first, they were that unknown really, that you could smoke them anywhere, smoke them in the bingo, smoke them at work but obviously slowly but surely studies may have come out that they harmful b'cos we are now not allowed vaping anywhere really [...]

Debbie expressed that if EC were banned, she believes she would relapse back to CTCs.

Debbie (Category 1) [196-199] : [...] I'd probably resist it for a bit and then I think I'd buy a packet of Benson and Hedges and they'd be too smokey and I wouldn't like it, and then I think I would just go and buy some tobacco and just roll my own... I think it's what I do, I don't think it would be straight away and I'd absolutely hate it, but I'd do it [...] just the governments banning it or trying to get in the way that just makes me cross because they are so clearly putting profit over people's lives, they just want

the income from the tax I'm thinking, it makes me quite nervous because the issue of whether or not to tax it keeps coming back and going away so then the price would shoot up [...]

This would have important consequences for public health as in 2020 the main reason given for using ECs being to help smokers quit (ASH, 2020). Given this, research evaluating how regulation shapes social acceptability of ECs is of particular importance, as due to fluctuating regulations, individuals look to their social sphere for guidance on acceptability (Fiske, 2018).

Eve (Category 4) [113-116]: I think it's a bit confusing and... like I get it cos like your treating it the same as a cigarette essentially...I guess, but if you're trying to encourage people to stop smoking by using it then it doesn't make sense to have the same bans on them [...]

Even within the realm of the devices themselves, irrespective of CTCs there seemed to be varying levels of acceptability, relating to the size of the device and the amount of SHV they produce .

Debbie (Category 1) [122-125]: [...] if we'd have gone in and we were blowing massive clouds people would object but if you've just got that [smaller EC device] and you breathe in and virtually nothing comes out nobodies gonna even notice or mind or perhaps they might be like 'oh it smells of blackcurrants in here' [...]

Eve (Category 4) [159-160]: [...] do you know when it just looks massive and there's a big thing coming out the end of it and you just think 'you look like a d*ckhead', so it was just like, mine was dead little [...]

This was also noted in Section 5.3.2.2, when Debbie discussed how she used different EC devices for work and at home. This requires further exploration as it provides a unique insight into the typology of between EC products irrespective of CTCs, as well as the varying levels of acceptability.

5.3.3 Summary of Theme 1

Social context as a key theme was constructed from the reoccurring comments from participants that were based on the external social elements that influence decisions surrounding ECs, acting as an encouraging or deterring factor of EC use. This theme reveals several consistencies about how social factors might influence use among participants in this study. ECs were generally more socially acceptable when compared to CTCs. The social norms established the acceptable attributes of individual identities relating to EC behaviour. Reasons for initiation of ECs were often related to these perceived norms and acceptability, as well as the influence of a persuasive person. Therefore, this suggests that social interactions are influential in shaping norms, attitudes, and behaviour surrounding ECs, playing a complex and unique role in the way individuals make decisions regarding them. Even within the realm of the devices themselves there seemed to be varying levels of acceptability irrespective of CTCs, which should be explored further in future research.

5.3.4 Theme 2: Representation and Knowledge

The second key theme driven by the data set was representation and knowledge. Participant accounts identified the impact of EC related communication in shaping their awareness and understanding. Representation of ECs through varied media outlets played a significant role in constructing knowledge and therefore influenced decisions surrounding use, this appeared to be a cyclical, rather than linear process. Much of the analysis relates to participants' internalisation of the information they are most exposed to. Elements of this theme are evidenced and highlighted through the following subthemes: i) communication; ii) uncertainty and iii) importance of education.

5.3.4.1 Communication

EC information is communicated through a wide range of platforms and media, which understandably has an effect on how they are perceived, therefore acting as an encouraging or deterring factor. Paul expressed concerns that these forms of communication may be enticing younger and/or vulnerable individuals to initiate EC use:

Paul (Category 1) [196-198]: [...] I think the media plays an awful part in portraying them as these amazing flavours, very conventional and very easy to use, and yes, they are very easy to use and they have some great flavours, but we must be careful with the younger demographic [...]

Reported exposure to EC advertisements in shopping centres TV, and print media has been previously noted, as well as perceptions that these EC advertisements portray the devices as attractive and cool (Johnson et al., 2016). One participant who had never previously smoked was introduced to ECs as part of a social media promotion party:

Beth (Category 5) [7-10]: [...] I went to a party and it was a vape party at Menagerie in Manchester, it was Henry Holland the designer, he had released a vape line, so I went, tried it there and actually really enjoyed it, and obviously because it's got tobacco in, I think it gave me a head rush, so I think that's probably how it started and then subsequently I'm probably addicted to it now [...]

In this specific situation, EC were not promoted as a cessation device but as a fashion accessory. In 2019, 'House of Holland' a fashion company, designed Vype devices that were promoted on social media. Social media platforms have often been used to publicise ECs as lifestyle products (Bauld et al., 2014). The unregulated and widespread marketing of ECs on social media has often been described especially troublesome due to its potential to attract non-smokers (Vandewater et al., 2018) which has been evidenced in Beth's case.

Debbie pointed out her irritations with how the news communicates information about ECs:

Debbie (Category 1) [150-152]: [...] the news annoys me because they report it as being unsafe and you think it's because you haven't encouraged it or licensed it, so people have to buy things from China that are perhaps not as safe and not as regulated! [...]

This opposes findings from research which analysed news representations of ECs in the UK and found that coverage often took a 'balanced' approach, presenting readers with the positive and negatives of use with a shift over time from uncertainty to a greater familiarity

(Rooke and Amos, 2013). Tom also indicated that the fears surrounding the technology is due to its relative novelty:

Tom [302-306]: [...] I remember when mobile phones were first a thing and people were like 'oh it gives you cancer in your brain – its radio waves in your head' and all that, and like you could get like little things that you put over the speakers that were like magnetic or had like tinfoil or something that's supposed to block the radio waves – and that turned out to be nothing, y'know it was nothing and we now know it's just not physically possible, so I assume now it's just the same thing, it's just like a public fear because it's a new technology [...]

These comments echo concepts from the diffusion of innovations theory (Rodgers, 1983), which poses that mass media is largely responsible for shaping perceptions of new technologies (Rooke and Amos, 2013) and contributes to constructive interpretive frameworks which shape how ECs are understood. This is supported by research that has explored the impact of tobacco control campaigns in the media, which has demonstrated that they can shape public attitudes toward smoking (Kuipers et al., 2017). Equally, an educational campaign in England that used a wide variety of media platforms to communicate information about the relative harms of ECs when compared to CTCs, demonstrated that it could be effective in increasing smokers motivation to quit (Tattan-Birch et al., 2019). This demonstrates the vital obligation media outlets have to disclose accurate information.

Bob suggested that how ECs were being portrayed in media was related to efforts to steal CTC custom:

Bob (Category 6) [42-43]: [...] I think it was more of a corporate marketing tool, than trying to... it's - I think it's - it sounds really cynical but trying to steal cigarette custom [...]

Future research on advertising methods and their effects on consumers would provide better understanding of EC use and opportunities for public health officials to address health and access issues (Payne et al., 2017). The inconsistencies perceived in the information provided about ECs led to uncertainty.

5.3.4.2 Uncertainty

There was a general consensus that ECs were ‘safer overall’ (Tom C2 [316]) and understood as ‘a lot better than cigarettes at this moment in time’ (Daniel C3 [325]):

Bob (Category 6) [204-205]: [...] I think it’s a probably healthier than normal cigarettes, but I mean it’s still not good is it, it’s still a gust of second-hand steam flying off into the air – into your face – it’s probably better but it’s still considerably worse than nothing [...]

The use of the word ‘healthier’ implies both CTCs and ECs are healthy, but ECs are ‘healthier’, which takes away the gravity of the risks associated with either. However, some participants expressed how they were often presented with opposing information regarding the safety of ECs:

Carol (Category 2) [300-302]: [...] well you hear all different things like vaping is no good, vaping is better than smoking, like what is it? Is it no good or is it better than smoking? I think that’s the question cos you hear different things, one-minute vaping is ok the next minute vaping is not ok, so it’s like, is it? Or isn’t it? [...]

From the available evidence, health organisational bodies including PHE and the WHO claim that ECs are 95% less harmful than CTCs (PHE, 2019; WHO, 2020), although it is important to note that this does not mean they are harmless entirely, this may be why this figure has been contested (Eissenberg et al., 2020). It is therefore understandable that this led to some participants claiming that there were ‘a lot of grey areas’ (Beth C5 [123]).

Rose (Category 3) [238-248]: [...] I think that anything your breathing into your lungs like that you should have the same kind of thing so, do e-cigarettes cause heart failure? Do they cause erectile dysfunction? Do e-cigarettes cause lung disease? Mouth cancer? And if they do then that information needs to be available honestly, so that people can make an informed decision. I make an informed decision every time I smoke cigarettes, I know that I am at high risk of...cancer [...]

The ambiguity was also exacerbated by the limited available long-term research, this has also commonly noted as a deterring factor in alternative research (Pisinger and Døssing, 2014; Farrimond, 2016).

Tom (Category 2) [319-321]: we're not quite sure yet whether smoking e-cigs increases your risk of cancer because they've just not been here that long [...]

Daniel (Category 3) [286-287]: [...] I think at the moment I'm well aware that e-cigs are just too new to know if there's any long-term effects [...]

Bob (Category 6) [67-68]: [...] you can't measure someone's lungs for 30 years using e-cigarettes compared to normal cigarettes because it hasn't been there long enough [...]

Paul (Category 1) [310-311]: [...] we're almost like guinea pigs being experimented on – we don't know what the long-term effect will be but we – at the moment staying with it because we know it's the best of the two devils [...]

These trepidations are reflective of previous harm reduction strategies such as the 'light cigarette' which has understandably led to a lack of mistrust between THR products and the general public (Farrimond, 2016).

Paul (Category 1) [304-307]: I feel like this generation of e-cigarettes are the generation of in smoking in the 1950s and 60s in America where little was known about the effects of cigarettes and it took until the 80s until we realised that cigarettes caused cancer, so I feel like with e-cigarettes, generation Y are the smoking generation in the sense that we don't know the long-term effects [...]

The problematic history of tobacco control has resulted in taboo around working with harm reduction prospects and moved toward an abstinence model, with an understandable resistance toward working with the industry (Farrimond, 2016). This ultimately resulted in taboo around working with industries to create 'better' products, ongoing arguments and debates over policy (Farrimond, 2016).

Tom (Category 2) [306-308]: [...] It's just like a public fear because it's a new technology and cos science isn't telling us – one way or another we are just gonna like – whatever is the most sensationalist or whatever seems to conform to our bias the most [...]

Uncertain attitudes toward ECs have been associated with contradictory information (Lucherini et al., 2018). Eve expressed information could be available, but she does not actively search for it:

Eve (Category 4) [125-127]: [...] I don't know, does it affect you the same way as smoking? Like I just don't know, but then again, I don't know if that information is out there and I've just not gone to find it [...]

This suggests that there is a need for all information regarding ECs to be transparent and readily available when choosing to purchase the devices, or related products. However, this is difficult when there is no definitive evidence in particular for the long-term health consequences and the evidence that is available is contradictory and open to (mis) interpretation. Users such as Eve who are choosing to use the devices should not have to go 'searching' for information, it should be readily available when making a decision to buy them, in a similar format to health warnings on CTCs packets. Harm-reduction campaigns should consider educating the public on understanding the difference between evidence-based claims and marketing strategies.

5.3.4.3 Importance of Education

The importance of education regarding the safety of the devices has been made evident in the previous section and in previous research (McKegnaey and Dickinson, 2017), however these data also convey the importance of education when using the device. For some, this 'alien' (Paul C1 [142]) concept could be viewed as overwhelming and potentially act as a barrier to use.

Paul (Category 1) [138-140]: [...] if you're a newbie to vaping you walk in to a conventional vape shop and they have all these coils and devices, you're almost blown away with all the mod cons and how to fill the devices up and the coils so I think it definitely puts people off [...]

EC technology is constantly developing, with a growing abundance of flavours and devices (explored further in Section 5.3.8.2), this was noted by some participants:

Tom (Category 2) [132-133/166-169]: it wasn't that great, technology hadn't advanced that much so they still were not very satisfying to smoke, they didn't feel the same as you inhaled and they didn't get as much [...] when I tried e-cigarettes for the second time and things were a bit more advanced and a bit more modern and more recent models, that's why I became more conscious of it because obviously having the previous experience and then going back and thinking well why did that not work last time and you start to sort of reassess things [...]

Debbie discussed device difficulties and concluded that perseverance and determination were important in developing competency:

Debbie (Category 1) [250-252]: [...] I think a lot of people overuse the coils and just continue to use them when the coil burnt – and they don't know enough about the flavour thing - 'oh my coils burnt, I need to change it' - and they just continue to use it [...]

Although not all participants had this determination:

Eve (Category 4) [162-164]: [...] I felt like at the start I used to get a lot of smoke from it but toward the end I wasn't getting a lot, it's stupid, I don't know why like that effected it but not getting as much smoke from it made me not want to use it [...]

Alternative research also found that the specialised knowledge that is associated with using ECs is complex, and in some ways this cliquey aspect of EC culture can act as a deterring factor (McKegnaey and Dickinson, 2017). Previous research has discussed how the delivery of information and advice from other EC users, particularly on online spaces and forums, is useful when using ECs (Emery et al., 2014):

Debbie (Category 1) [157-165]: [...]: YouTube channels and shows and networks and things so they'd be reviews of course and it would show you how to make coils or what to buy, they'd have politics on, and there were just lots of people on, it was like

a real community thing and it wasn't a particular niche of people – so you'd have like middle aged women and really trendy young blokes and just all sorts of people would just be together saying 'this is made a fabulous difference to my life', it was just a really supportive nice atmosphere [...] they'd tell you where to get your wire from and which cotton wool was the best [...] so it was just like a real community feel to it [...]

The sharing of knowledge from more experienced users appeared to facilitate Debbie's quit attempt. Farrimond (2016) has noted that EC technology can be complex, and initiation may be difficult for 'newbies'. Users often look to other users or sellers for advice, generating a social network of shared knowledge (McKeganey and Dickinson, 2017). In Debbie's account, the shared knowledge from other users encouraged her to continue using ECs by easing her understanding of how to use the device. Boothroyd and Lewis (2016) also discuss how peer-to-peer internet communication co-creates knowledge, producing alternative and new forms of expertise.

From this, it could be suggested that psychoeducation and peer support networks could be incorporated into cessation interventions using ECs, whereby experienced users share knowledge with non-experienced users. Social learning theory (SLT: Bandura, 1977b) emphasises the importance of observational learning and modelling in behaviour. The self-efficacy construct of the HBM (Rosenstock, 1974) could also be considered in this instance, as individual confidence may increase as a result of encouragement and useful knowledge from peers.

5.3.5 Summary of Theme 2

Representation and knowledge was identified as the second key theme in regard to the factors that encourage or deter EC use. The subthemes conveyed the importance of how information, regardless of its accuracy, is communicated through varying forms of mass media. Uncertainty was understandable when considering the relative novelty of the products and the conflicting information available, this is also supported by the diffusion of innovation theory and how media shapes perceptions of innovations. It is vital that information regarding ECs is regulated for its accuracy and readily available when purchasing products, mirroring CTC health warnings. Understandably, feelings of uncertainty highlighted the importance of education, this relates to both the knowledge regarding the safety as well as the practical knowledge required for use.

5.3.6 Theme 3: Aspects of Addiction

The third key theme identified from this data was aspects of addiction, which acts as an overarching representation of the aspects of (CTC/nicotine) addiction and how this influences EC use. Reasons for EC were discussed, most participants initially began using ECs as a means of quitting smoking or reducing the amount of CTCs smoked. Therefore, the efficacy of ECs as a smoking cessation device were discussed, as well as the behavioural-sensory similarities/differences that affected the efficacy, and the negative affect reduction which impacts decisions to smoke/vape. Elements of this theme is evidenced and highlighted through the following subthemes: i) intentions; ii) behavioural-sensory; iii) position as a cessation device.

5.3.6.1 Intentions

Understandably, when considering the range of participant categories in this study, individual intentions varied. Although, as previously discussed most participants initially used ECs as cessation devices:

Paul (Category 1) [2-3]: [...] I have successfully quit smoking and now I'm using an e-cigarette [...]

Carol (Category 2) [3-5]: [...] about five years ago I wanted to quit, I...did manage it for two years and then obviously life and that – I went back on them, it took one cigarette and that was it, I was back on the cigarettes but I have got another e-cigarette that I'm going to try, I think [...]

Leanne (Category 2) [2-4]: [...] I've tried to stop smoking three times using e-cigarettes [...]

Tom (Category 2) [2-4]: [...] I'm a smoker who has tried to quit using e-cigs but has so far failed and as of now I mostly smoke roll ups and cigarettes [...]

This is understandable as the most common motivation for EC use in the UK is related to reducing or ceasing CTC usage (ASH, 2020). Although Bob, a non-smoker/vaper disagreed that this was why individuals choose to use ECS.

Bob (Category 6) [86-87]: I don't know of anyone that has changed to e-cigarettes to stop smoking – it's to have like...the organic version of a cigarette I guess [...]

For Eve and Beth, the participants who were not using ECs as a cessation devices, curiosity was the driving factor that influenced initiation:

Eve (Category 4) [42-45]: [...] I want to do it! And I wanted to know like what it tastes like, is it different to shisha? Is it different to smoking? How like does it feel? And obviously it doesn't feel as like heavy or anything, does it? It doesn't even feel like your smoking, it just feels like there's something to do, but then you do go a bit lightheaded and then I quite liked the feeling, so then I carried on [...]

Beth (Category 5) [26-29]: [...] they were walking round and just giving them out to people and telling them how to use them and also... giving people the option whether they wanted to try it with nicotine or without, so, I think initially I tried one of my friends, but I got one of the ones without [nicotine] for myself and I tried my friends and hers had nicotine in and I noticed the difference, like getting the head rush [...]

Curiosity as reason for ECs has been reported in other studies (Pepper et al., 2014; Amato et al., 2016).

Participants that were using (or had used) ECs as a cessation device discussed certain 'mindsets' (Leanne [50/75/216/222]) and 'willpower' (Carol C2 [52/102]) and the relevance of these in regard to a successful quit attempt and consequently how this influenced EC use.

Leanne (Category 2) [76-78]: [...] I feel like I don't have the willpower sorta thing, I do have the willpower b'cos I've done it, I've done it for 3 month, 4 month and people will be like 'God, that is the hardest part' [...]

This idea of a mindset was even noted by a non-smoker/vaper:

Michael (Category 6) [64-64]: [...] I think it's very linked to the strength of your mind, it's my experience so I am forced to remember myself when I'm drinking alcohol that I don't want a cigarette even if the trigger comes in that I want one [...]

It appeared that these 'mindsets' related to smoking behaviour were also considered when contemplating reducing EC use:

Paul (Category 1) [163-165]: [...] more of the mental toughness and grit to do that, so each week now I'm trying to reduce it from like 18mg last week then down to 12mg then perhaps down to 6, just trying to see what the difference is [...]

Tracey (Category 6) [132-135]: [...] I've thought about it while I was been on holiday recently and I thought I do really need to get out of it [EC use] and I need to get in the mindset that I'm not, and I don't want to have that [EC] in my hand indefinitely, so it's just figuring it out, the best way for me to do it [...]

There is a need for research exploring how smokers who have managed to quit using an EC can then discontinue using their EC, so professional advice can then be given regarding this issue. The 'addiction mindset' has been previously discussed (Sridharan et al., 2019) and is not necessarily about the flexibility of problematic behaviours themselves, but instead, the flexibility of the qualities that underlie the behaviours. The popular belief that one may stop smoking but 'deep down' they will always be a smoker, for example, the 'once an addiction always an addict' (Sidharan et al., 2019) can be considered here. The Health Belief Model (Rosenstock, 1974) suggests that personal beliefs about the outcomes of behaviour change ultimately determines successful change. It is possible to believe that addiction is generally malleable, whilst also believing personal addictive behaviours are permanent (Sridharan et al., 2019). This was also evidenced by Leanne, whose mother had quit smoking, but she was still a smoker:

Leanne (Category 2) [98-105]: [...] I think I caved in the middle of somewhere, but yeah I think I would try maybe that or the hypnotized, I'd go other ways around it, but my mam stopped with an e-cigarette, now my mam smoked since she was 14 and she's 52 now and she hasn't had a fag for six years so she would be a good person for your interview to be honest b'cos I never in all my life thought that my mam would

quit and she literally did, she went on the e-cigarette, stopped the – she was on the e-cigarette for two and half years and then went on to the tablets every time she felt like she needed the e-cigarette – she shot it in the bin and then she was on the tablets for about three weeks and now she hasn't even had anything [...]

Exploring mindset in the context of addiction could shed light on specific facilitators and barriers of addiction, for example individual beliefs about the permanence of such qualities. Previous research has demonstrated that a 'growth' (the behaviour is malleable) mindset is more effective in smoking cessation when compared to a fixed (the behaviour is unchangeable) mindset (Sridharan et al., 2019). This could be important, when considering that individuals smoke on the journey to permanent quitting, often fluctuating between quitting and smoking (Gökbayrak et al., 2015). This means that 'fixed' mindsets (smoker vs. non-smoker) could be limiting in terms of THR.

5.3.6.2 Behavioural-Sensory

The behavioural-sensory similarities between CTC and EC are heavily discussed in the literature (Etter and Bullen, 2011; Dawkins et al., 2012; Caponnetto et al., 2013; Cox and Jakes, 2017). These data identified that the similar hand-to-mouth movements, as well as the observable exhalation was an important encouraging factor for some participants in this study, in terms of creating a recognisable and familiar experience.

Rose (Category 3) [156]: I think that was the hand-mouth thing that I needed [...]

Tracey (Category 1) [126]: [...] it's just habit, yeah, it's just something in your hand [...]

Paul (Category 1) [183-185]: [...] they offer an alternative to smokers in the sense that a lot of people, like me, they like the mouth-to-hand contact, they like that instant rush of nicotine, they like how it feels in their hands [...]

Even the non-smokers/vapers were aware of this element:

Bob (Category 6) [84-85]: [...] like the fact people who smoke are used to fidgeting with their hands and that's one of the big reasons you actually need cigarette isn't it [...]

Michael (Category 6) [209-210]: [...] the nicotine patches...they want to have the same...like moving...you know what I mean the same behaviour as e-cigarettes [...]

Cigarette-like enjoyment has previously been suggested as a benefit of EC use (McQueen et al., 2011; Barbeau et al., 2013).

Paul (Category 1) [83-87]:[...] what I sort of dislike about the nicotine patches and the other nicotine replacement therapies is it's not the hand-to-mouth contact and also the very – they give you very gradual nicotine so it's almost in the background, if you want something like a quick dose of nicotine it's very easy to just pick up a vape and inhale, exhale and get that nicotine in your bloodstream really quickly whereas with the patches it's all very slow [...]

Unlike alternative forms of NRT, ECs can deliver nicotine to the brain at a similar speed, whilst also mimicking the physical sensation of vapour in the mouth during inhalation and the hand-to-mouth movements, managing to address the behavioural-sensory aspects of the addiction (Cox and Jakes, 2017). The speed of nicotine delivery was important and also led to one participant choosing a specific device:

Paul [111-114]: [...] I buy Juul, and Juul have various other flavours so you've got mango, crisp mint, berry flavour, and one of the things that makes it really stand out is that it has a substance called Nicotine Salt, this new form of liquid that enters your bloodstream quicker and gives you more of a nicotine hit [...]

The general method of smoking a CTC features a start and finish, meaning there is a set time frame of going for a cigarette. Whereas vaping is an open-ended practice, which can take a range of temporal patterns (Farrimond, 2016) such as continuous vaping dispersed throughout the day:

Tom [151-154]: [...] with the cigarette you – you smoke it and then you're done for a bit but with an e-cig you just smoke it until you feel like you don't wanna smoke it

anymore and then at any point following that you feel like you could have a quick couple of tokes on it and move on again so you ever feel like you are fully done with the e-cigarette and you can carry on [..]

Daniel [217-221]: [...] you just pop out, stand outside have a bit of your e-cig till you feel like you've been outside long enough – cos I'm not supposed to be going out when I go out, like it's kinda like the rules you have to take a full 15 minute break or whatever but b'cos they are quite relaxed about that I always feel like 'right I've been out long enough now' it's not, it's never 'oh I've had enough of my e-cig now erm whereas when it's a cigarette it's like 'right I've finished with that now so I'm gonna go' [...]

This new action of vaping therefore offers change in the symbolic meaning that is attached to nicotine addiction (Farrimond, 2017).

Tom [185-189]: [...] you're never mentally having that disconnect cos I suppose you associate a cigarette with a break and with switching off and not thinking about your work, or your lecture or whatever you've been doing for that hour so it's sort of a mental breathing space and you don't get that with an e-cig b'cos you can use it whenever, as opposed to a cigarette where you have to define when you are gonna use it, you have to use it in this break or you can't use it for another hour [...]

In one study it was found that vapers who were former smokers were liberated from their addiction to CTCs, whilst also acknowledging their addiction to nicotine (Keane et al., 2017). Although this was not the case for all participants, whereby the addiction was accentuated without the stop point that is inevitable with a CTC.

Leanne [24-27]: [...] when I'm at work now I won't have a cigarette until tonight, I'll have one on the way to work and then when I finish work on the way home, where with that [EC], I was literally waking up in the middle of the night, cos I kept it under my pillow, and smoking it, I was so addicted to that [...]

Leanne's account contrasts with finding from alternative research which demonstrated that there is a reduction in the symptoms of nicotine dependence when comparing smokers to vapers (Etter and Eisenberg, 2015).

5.3.6.3 Position as a Cessation Device

The most common reasons for EC use reported include quitting or cutting down CTC smoking (Dawkins; et al., 2013; Sussan et al., 2017; ASH, 2020), therefore it was understandable that the efficiency as a cessation device was identified as a subtheme. Tom explained that ECs could not address all elements of his addiction, such as specific cognitive associations.

Tom (Category 2) [193-197]: [...] I think there is an aspect to it that's not addressed as much – a lot of stopping smoking initiations, they do consider like your physical cravings, or they try to aim to replace cigarettes with like a patches or e-cigs or something like that, but they don't really address the cognitive associations people will have with it, they don't address the break routine, they don't address the habits of it [...]

These cognitive associations or psychological aspects of addiction demonstrate the differentiation between the habitual and chemically conditioned stimuli of CTC smoking, which was also noted by Rose:

Rose (Category 2) [248-249]: [...] when I decide I can, I can just quit b'cos I know I know that after 42 hours or 72 hours there's no nicotine, its only habit it after that [...]

It is the physiological effects of nicotine that sustain continued tobacco use (Benowitz, 2009). Yet, specific moods or situations can become associated with use, leading to habitual decisions to smoke, such as with an alcoholic drink or after a meal (Benowitz, 2009). For some participants in this study, ECs offered the 'perfect' (Debbie C1 [30]) method of preventing relapse.

Paul (Category 2) [286-289]: I think my first thought would be if you're a former smoker looking to get off smoking than e-cigarettes are great b'cos they offer a mouth-to-hand contact, they offer flavours which are very similar to cigarettes, such as menthol and tobacco, and they're a lot less cheaper and affordable to buy in terms of cartilages, a lot less cheaper to buy, they're a lot more discrete so you don't have that shame with it and erm, so that's definitely the benefit [...]

Tracey (Category 1) [117]: [...] I think this has been more effective for me in terms of not going back on to the cigarettes [...]

Daniel stated that regardless of the nicotine, 'if I feel like I really need a cigarette I'll go and buy cigarette' (Daniel C3 [16]), implying that for him, CTCs and ECs are viewed as completely distinct.

Leanne (Category 2) [39-40]: [...] I don't think I would go down the vape route, I'll try - I would try and get hypnotized or something this time [...]

Tom (Category 2) [253-255]: [...] toward the end as I started realising that I'm just using it more and more and it's not satisfying me as much, so I might as well just buy as a pack of cigs – because nothing else will sort of satisfy the withdrawal urge [...]

Paul felt that although the device may prevent smoking CTCs, some devices can't reduce nicotine addiction:

Paul (Category 1) [156-158]: [...] I have in the past always remained on 18mg but b'cos I'm trying to cut down the strength of my mg, I only buy 12, the issue is with some leading vape companies is that they only have them in set amount of mg, Juul for instance only has them in 18 and I think y'know for a person wanting to reduce the amount of nicotine that they are getting it's very hard [...]

This was particularly poignant as it brings up considerations regarding 'the next steps' for those that have quit smoking CTCs - how do they intend stop using their ECs? Tracey, who had been using 0mg nicotine for '10 to 11 months' (Tracey C1 [147]), expressed her apprehensions about discontinuing EC use, even though she used a nicotine e-liquid:

Tracey (Category 1) [141-144]: [...] I don't want to have another cigarette; do you know what I mean? I just don't want to have one but, the worry is, like you say, would I go back on to real cigarettes rather than on to an E, d'ya know what I mean? So that's something I'm kind of psyching myself up for, b'cos it [EC] needs to be

gone, its served me a great purpose and its done what I want it to do but the habits there and I need to break that habit and put that in the bin [...]

Some participants felt that ECs had increased their nicotine dependency:

Leanne (Category 2) [35]: [...] I still became more addicted to that vape, it'd be in my hand at all times [...]

Daniel (Category 3) [135-137]: [...] I know that's wrong now especially because of how much I'm using my e-cigarette at the moment, but I'm always saying I don't actually need it I don't want it, but if it's there I'll have it [...]

In a narrative review, it was concluded that the debate of whether vaping perpetuates or attenuates nicotine addiction depends on the underlying incentive of whether an individual is motivated to quit or not (Rahman et al., 2015). This is understandable as aforementioned the TPB (Ajzen, 1991) and the HBM (Rosenstock, 1974), two key influencing models in health behaviour emphasise the importance on behavioural intention in overall behaviour change (Section 5.3.6.1).

Beth, who had never previously smoked, discussed how she believes she is now addicted to nicotine:

Beth (Category 5) [27-30]: [...] the option whether they wanted to try it with nicotine or without so I think initially I tried one of my friends, but I got one of the ones without [nicotine] for myself and I tried my friends and hers had nicotine in and I noticed the difference, like getting the head rush [...] I guess probably I am addicted because I wouldn't choose to use a non-nicotine one [...]

There are two issues of to be considered here: (1) ECs resulting in the instigation of nicotine addiction in a previously non-addicted individual and (2) whether this EC use and subsequent addiction to nicotine act as gateway to CTC smoking. EC use and the gateway potential to CTC smoking is often explored amongst adolescents (Chatterjee et al., 2016; Lee et al., 2019), as Beth previously stated, 'when I didn't have my vape I ask him [boyfriend] for a cigarette' (Beth, C5 [86]).

Negative affect reduction was noticed by some participants in relation to unpleasant emotions such as stress.

Debbie (Category 1) [16-18]: [...] I used to be a reward smoker so you'd get over something stressful or get over something horrible and then you would get a cigarette – so it's just erm, well I think everybody's got a vice and mine was smoking [...]

Rose (Category 2) [6-7]: [...] I've smoked since I was 13 years old and I've managed to stop successfully at times by just stopping but then usually find my way back to cigarettes as a method of coping or stressful situations [...]

For Daniel, a dual user, whether he used an EC or smoked a CTC was related to stress:

Daniel (Category 3) [14-15]: [...] I'd say I get one packet every 2 weeks but that really depends on what I'm doing and like how stressed out I'm feeling at that time [...]

It is well documented that stress results in increased smoking (Cohen and Lichtenstein, 1990; Kim et al., 2019), yet there is little empirical evidence which supports the claim that smoking reduces stress. In fact, stress reduction as a direct product of smoking, is more likely to be a form of relief from removing withdrawal-induced symptoms that are often experienced between CTC use (Parrot, 1999; Kassal, 2000). Beth also discussed how her EC uptake reduced her alcohol consumption, which was previously her personal method of relieving stress.

Beth (Category 5) [55-57]: [...] probably for like a stress release maybe and I have probably replaced – I used to drink wine at night, so I have probably replaced drinking wine with a vape, which is probably good for weight loss but not good for anything else [...]

Beth also discussed weight loss; this was also a reason that some participants were concerned about quitting smoking:

Carol (Category 2) [23-24]: [...] I'm being honest is why I haven't packed in y'know because of me weight, y'know me sisters quite big and she's never smoked but I am putting weight on now [...]

Leanne (Category 2) [117-119]: [...] she's gained so much weight that sometimes, she finds it so difficult to lose, she'll go 'see that's the only thing I know if I had a fag, I'd probably lose all me weight, if I started smoking again' [...]

Fear of weight gain has been previously discussed as a barrier for smoking cessation (Jackson et al., 2019) as there is evidence suggests that successful cessation attempts can result in weight gain (Lycett et al., 2011; Aubin et al., 2012). It has been suggested (but not demonstrated) that ECs could possibly reduce weight gain when compared to smoking cessation routes without alternative nicotine (Glover et al., 2017). According to Jackson et al. (2019), one in 22 people vape to prevent weight gain, and should evidence emerge that ECs do in fact prevent weight gain then one in eight people would be tempted to switch from CTCs to ECs. A qualitative study also found there is confusion relating to the reasons why nicotine prevents weight gain and a subsequent concern that flavoured e-liquids may provoke food cravings (Dobbie et al., 2020).

Negative affect reduction has been previously discussed as a factor influencing EC use (Harrell et al., 2019). Personal enjoyment of CTCs was often discussed in relation to how effective ECs were as cessation devices. Therefore, it was understandable that an encouraging and/or deterring factor of use was dependent on how well ECs could mirror the enjoyable element of the CTC experience. Individual narratives regarding the features of ECs that were (not) enjoyable by users were varied:

Debbie (Category 1) [112-113]: [...] it perfectly replaced everything that I liked about smoking so I could get my nicotine and I felt good about myself and I felt that I'd made this discovery [...]

Rose (Category 3) [151-152]: I've started trying to use it, but actually I dunno whether it's just better for me to just stick, because I don't get any satisfaction with it [...]

Tom (Category 2) [236-237]: [...] I tried to move to the e-cigs but it didn't feel like they were strong enough, they weren't satisfying the nicotine, there wasn't as much nicotine in them [...]

The absence of the pleasure discourse in accounts of substance use has been discussed previously (Duff, 2008; Moore, 2008; Farrimond, 2016). This marginalisation is linked to the dominance of the medical model in the West, whereby pleasure, desire or emotions are rarely considered in addiction. As ECs are often developed as consumer product, they offer boundless possibilities for consumption, placing pleasure centre-stage (Farrimond, 2016). As such, this element of EC use, somewhat mirrors contemporary alcohol culture (Marcham and Springston, 2017). This is important, as one participant who successfully quit claimed 'if I had tried it and I hadn't of liked it I wouldn't of...I wouldn't of persevered with it' (Debbie C1 [292]).

For never smokers, the enjoyment may have influenced their decision to continue using the EC.

Michael (Category 6) [39-40]: [...] I tried it once, or I tried it twice, but I noticed that I don't like it [laughs] I know that doesn't make sense but yeah, I just noticed that I don't like it [...]

Beth (Category 5) [186]: [...] I mean I do enjoy it, it's not something that I don't enjoy [...]

Participants often drew similarities and differences between traditional CTCs and ECs, which was not surprising, given they are viewed most commonly as a cessation device (Dawkins et al., 2013; Sussan et al., 2017; ASH, 2020). Comparing ECs against CTCs at many levels was an important method for understanding and evaluating them.

Tom (Category 2) [150-151]: [...] your sat there thinking this doesn't feel like a cigarette so there is some sort of erm, behavioural adaptation to it that you don't get with the e-cig b'cos your circumstances are different [...]

Daniel (Category 3) [307-309]: [...] regardless of the nicotine I think it's a completely different experience, cos I've – people have said to me like 'oh can I have a go on your e-cig?' who've never even touched a cigarette, so that in itself is seen as like new and exciting like 'oh can I try some of that?' [...]

It appears that ECs (unfamiliar phenomena) can be made sense of collectively by reflecting and comparing them with more familiar phenomena (CTCs) (Vandrevala, 2017).

Carol (Category 2) [29-30]: [...] its weird b'cos the e-cigarette isn't like a cigarette, I can't explain it but it's nothing like a cigarette y'know ya getting the nicotine and the inhaling it, but a cigarette is totally different to the e-cigarette [...]

For EC users, looking to use the devices as a quitting tool, this can often be frustrating when ECs are treated the same as CTCs (this is also explored in Section 5.3.2.3).

Rose (Category 3) [193-196]: [...] I mean ya not allowed to smoke them still in a public places so that, which to me is ludicrous b'cos it's not secondary smoke, so I can't see the problem with it, so y'know to say to all these people having to stand outside with e-cigarettes today, to me just seems unnecessary [...]

Although some participants reported that the action of the ritual can be just as important as the product itself (Section 5.3.6.2), others claimed that ECs were less satisfying in terms of the sensory feelings experienced in the mouth and throat. Some participants claimed ECs were less pleasurable and did not provide the same rewards as smoking.

Eve (Category 4) [67-68]: [...] I know that it sounds stupid because obviously you're still getting the nicotine and the stuff from it, it just doesn't feel the same, I don't think it chills you the same [...]

Rose (Category 3) [158-160]: [...] it was just a plastic cigarette and basically it was the, as ya sucked in you got a [makes noise] like that, I think it was just something going against the tube that you were sucking and it was a horrible taste, it was a foul taste [...]

Not only is the experience of using the EC different to a CTC experience, but they are also perceived differently by non-users.

Bob [143-145]: [...] its different to cigarettes you know what I mean? It's this completely different thing [...]

Michael [126-127]: [...] I think with cigarettes you can just ask one....but an e-cigarette isn't that shareable...it's more personable [...]

Dwyer (2011) also noted that the universal nature of CTCs makes them interchangeable items which can be freely distributed, shared, given or exchanged as single units as tokens of friendship and liberality. In opposition to this, ECs are reusable private individual property which are exclusive singular objects marked by the identity of the owner (Keane et al., 2017). There is potential for them to be part of a hobby, this was also noted by Debbie as part of her reasonings for enjoying ECs as she 'got into the hobby side of it' (Debbie [104/105/114/254/264]):

Debbie (Category 1) [114-117]: [...] I used to roll my own cigarettes, so now I could make my own coils and put the cotton wool through it and get different batteries and there was all these different devices coming out, so all the money that you are saving because you're not buying cigarettes you can treat yourself to something shiny and it can develop into a real hobby [...]

The maintenance of modifiable ECs developing into a pleasurable hobby has been noted by other researchers (Pokheral et al., 2015). The pleasure and enjoyment that comes from customisation has made ECs more popular than other forms of NRT (Simmons et al., 2016). Daniel noticed the gadgetry aspect of the devices.

Daniel (Category 3) [333-335]: [...] the gadgetry of it, it's not seen as something burning and your inhaling smoke, it's like not called smoking it's called vaping 'oh yeah you can have this and there's all these crazy flavours', it's almost like sweets, it's - very similar to the sweet shop thing but it's like an adult version [...]

In this sense, choosing flavours can be an expression of individuality and distinction (Keane et al., 2017).

Eve (Category 4) [201-203]: I go and buy my e-cig stuff and when ya go in it's literally is like a sweet shop, like everything is laid out, you pick the one you want and it feels like, and it smells like that as well, it feels like a shopping experience [...]

The possibility of choice alters the repetitive element addiction, it promotes the idea that vaping is a hobby, as the continuously increasing range of flavours and types of devices allows users to distance themselves from the title of being a smoker to a vaper (Lucherini et al., 2018).

It is also important to discuss these elements of the EC experience that take some users back to their childhood by evoking pleasant memories of sweet shops. Research has demonstrated how odour-evoked memories can influence perceptions of a product (Sugiyama et al., 2015). These known as Proustian memories and are extremely influential in driving human behaviour (Sugiyama et al., 2015). Recent research has highlighted that pleasant olfactory cues can reduce CTC cravings. Future research should explore how these cues can impact smoking cessation interventions (Sayette et al., 2019).

5.3.7 Summary of Theme 3

The most commonly reported reason for initiation for ECs for participants in this study were related to smoking cessation, so it was understandable the third key theme was constructed relate to addiction and how this influences decision-making regarding ECs. The components of addiction that appeared to act as an encouraging or deterring factors included physical and habitual elements, as well as the behavioural-sensory similarities and/or differences experienced with ECs. Personal enjoyment was an important component in the continued use of ECs, and this element of addiction in relation to ECs should be explored in more depth. ECs met the needs of some ex-smokers by substituting the physical and psychological elements of tobacco addiction, but this was not the case for all participants. Although this theme was reflected more in participant accounts from categories one to four, one participant from the emerging demographic claimed EC use had subsequently developed an addiction to nicotine.

5.3.8 Theme 4: Device Related issues

The final theme, device related issues was constructed from participant beliefs and experiences surrounding the health and risk outcomes that are related to using the device. It was also composed from discussions around the physical and practical properties of EC devices, and the convenience of accessing them and their related products. This theme is evidenced through the following subthemes: i) health and risk; ii) device functionality and iii) convenience.

5.3.8.1 Health and Risk

Consequences of EC use regardless of purpose were discussed by participants. Generally, participants agreed ECs were a healthier alternative to CTC smoking:

Daniel (Category 3) [177]: [...] There is definitely a health benefit [...]

Bob (Category 6) [67]: [...] they are supposed to be the healthy alternative to cigarettes [...]

Leanne (Category 2) [198]: [...] I've read that they're much better for ya than a cigarette, much better [...]

Framing ECs are 'healthier' rather than 'safer' or 'less risky' (as viewed by Public Health professionals) may minimise the risk of use. Naturally, there are concerns over the general safety of the content of the devices. There was also unanimity that there must be some negative health effects, although there was uncertainty on exactly what these were.

Michael (Category 6) [195-192]: [...] I could imagine that e-cigarette users have the same effect...because as I assumed there are some residues in the lung as well and that will have some bad impact on your stamina...so I would transfer the experience of shisha and cigarettes to e-cigarettes – so you will have the same issue [...]

Bob (Category 6) [132-134]: [...] how about it next year – this time next year a report will come out absolutely scathing it and saying 'it's just as bad maybe it's even

worse' it's just like...you know the vape thing that like comes out it could be toxic you just don't know, do you? [...]

Leanne (Category 2) [206-208]: [...] are they safe to use? I don't think I've ever read anything that would say 100% this is better for ya, I've never read anything that in words says 'yeah, studies have found that' [...]

Uncertainty regarding the devices is also discussed in Section 5.3.4.2. Tom noted the negative effects on his lungs after using the device for only three weeks:

Tom (Category 2) [271-272]: [...] I noticed, the first two or three weeks my lungs and my throat felt heavier and sore [...]

Alternative research has also reported negative health effects including mouth and throat irritations, dry cough and dizziness (Soule et al., 2016). Chemical effects and respiratory concerns have been reported as the biggest deterring factors among tobacco users (Rohde et al., 2019). However, other participants noticed positive changes from switching.

Tracey (Category 6) [161-164]: [...] your sense of smell, your food tasted better, your skin looked better [...] cos my skin, it used to appear kind of like – it looked like it was grey – it wasn't grey I think it was just the pallet that smokers have, d'ya know what I mean? But yeah, taste buds improve immensely b'cos you haven't got that stale smoke taste in your mouth [...]

Concerns about risks to health are the most common concern for smokers and are often the motivation for reducing consumption and/or moving toward quitting completely though the use of ECs (Vandrevela, 2017).

Carol (Category 2) [155-157]: [...] I was able to walk further, whereas now when I walk upstairs I'm like [breathes heavily] but no, it's only a few steps but I have got a bad foot so I'm kind of thinking 'oh I'm in pain' with that, but I was able to walk better without being out of breath [...]

Participants acknowledged the negative health implications they experienced from CTCs; however, these became more evident after EC initiation:

Daniel (Category 3) [170-174]: I've been to the gym when I was really smoking, you could just tell, if I've not been to the gym for a few days and then I'd go in and I'd still be smoking before I go in and after I go out and I'd be like on the treadmill and I'd feel that I was out of breath whereas recently the last few months I've been going to the gym and I was able to do more than I could [...]

Paul (Category 1) [248-250]: [...] I noticed was that I wouldn't have the cough in the morning, so if I was smoking 20 a day I'd wake up with a cough, a persistent cough, it wouldn't go till midday, but now with an e-cigarette I don't really have the cough in the morning, although I do have sometimes if I vape too much I have a sort of tight, tightness in my throat [...]

Risks from EC use were also discussed, more commonly, popcorn lung. Popcorn lung is one of the most commonly held concerns regarding ECs (PHE, 2019). It is the nickname for bronchiolitis obliterans, a lung condition that damages small airways in the lungs, making one feeling short of breath and subsequently coughing (Cancer Research UK, 2020a). Popcorn lung is linked to the inhalation of diacetyl, it came to prominence when a group of popcorn factory workers developed the rare condition (Cancer Research UK, 2020a).

Leanne (Category 2) [198-199/ 210]: [...] if you're smoking them really intensely they can do something called popcorn lung to you, but yeah, overall, the things that I've read is that they are better than a cigarette, but like anything there is dangers [...] Like I've read them blowing – blowing up in people's pockets and stuff! [...]

Paul (Category 2) [207-210]: [...] there's still ingredients within the liquids that have been known to cause popcorn lung and has been known to cause – contains various other ingredients that are used in food and we should be checking them [...]

A study which brought together smokers, vapers, non-smokers and healthcare professionals to identify and agree priorities for EC research in the UK found that there were concerns and questions about popcorn lung (Hunter et al., 2020). This indicated that

there are still any myths around ECs that need addressing for the public, as there is enough evidence to suggest there is no risk of popcorn lung from vaping (Cancer Research UK, 2020a).

Debbie felt that the public health gains from people switching to ECs outweighed the potential risks:

Debbie (Category 1) [148-150]: [...] so even when they blow up it doesn't put me off because I think well you don't know what you're doing and then I think well it's not as bad as all these people dying from smoking related diseases so even that doesn't put me off [...]

The risk of youth uptake was also discussed, both Michael and Daniel felt that the novel, but in some ways nostalgic element may be inviting to younger people.

Michael (Category 6) [328-330]: [...] I think that might be an issue for young people that they aren't aware of the health risks which come along with e-cigarettes or cigarettes and they start using e-cigarettes earlier than they would use a normal cigarette and sometimes when I see the liquids in the shops they look like sweets [...]

Daniel (Category 3) [296-297]: [...] kids are just having them rather than just normal cigarettes - cos they are seen as cool, they are a gadget, it's like having an iPhone

This eventually led to the discussion of ECs acting as a gateway to CTC use, participants were concerned about ECs creating a nicotine addiction in non-smokers, who would eventually turn to CTCs in response to withdrawal.

Tracey (Category 1) [191-193]: [...] I don't think younger people should be using them cos I do think it poses a risk and potentially they might start off on one of them with all the different fancy flavours and the different styles of e-cigarettes and then progress to ordinary cigarettes [...]

Beth (Category 5) [100-102]: [...] I mean vaping when it first came out it was kind of like cool y'know to younger people, so I can definitely see young people starting to vape and then think actually I'm not getting the hit that I want anymore and then trying smoking instead and moving on to cigarette [...]

Although Tom did not think this posed much of a risk:

Tom (Category 2) [357-359]: [...] I don't think of it as risk, although I very much accept that there probably are some people who do start smoking e-cigarettes and think I'll try a regular cigarette and then start smoking regular cigarettes [...]

It is important to state that smoking activities among the youth were apparent, before the introduction of ECs (Centres for Disease Control and Prevention, 2018), this was noted by Rose:

Rose (Category 2) [372-373]: [...] I think it's an equal risk of what it was when I was younger in terms of oh I'm gonna have a cigarette, there will be a reason that they are going for the e-cigarette [...]

Michael suggested in attempt to combat these issues, schools should be more informative by explicitly educating students about the health risks associated with ECs.

Michael (Category 6) [332-334]: [...] they should do some prevention lessons in school to prevent students from - to tell them about the health risks of e-cigarettes as well because normally people say their kids that cigarette smoke is a bad thing but I'm not sure whether they do the same about e-cigarettes at the moment [...]

Concerns about SHV was discussed by some participants. The impact of second-hand smoke from CTCs is now widely appreciated, which may explain concerns about SHV. Generally, participants thought SHV was less risky and better smelling, than CTC smoke.

Bob (Category 6) [170-171]: [...] I'd probably say that cigarette smoke is probably less healthy than erm...in the atmosphere than e-cigarette vape [...]

Leanne (Category 2) [342-344]: [...] I do think you shouldn't be able to vape, you shouldn't be allowed to, cos literally when – you can't even see in some places, the amount of vape – especially these big ones what people have, the amount of smoke that comes out of them is nowhere near as much smoke that you even get from a cigarette, clouds and clouds of it! [...]

It has been suggested that it is important to continue to monitor the public perception of SHV compared to second-hand smoke from CTCs (Mello et al., 2015).

5.3.8.2 Device Functionality

How individuals experienced the device also influenced use, although this was unique depending on the type of device they used. EC technology and functionality has improved in recent years, as initially 'technology hadn't advanced that much so they still were not very satisfying to smoke' (Tom C2 [132]).

Debbie (Category 1) [214-216]: [...] I think the technology is sort of...levelled off, so in the early days, they'd be new things out all the time and they'd be like a real difference to the technology but-but now there's no real great leap forward that's gonna effect it so I might buy something new if something breaks [...]

In addition to endorsement, availability appeared to be an additional cue for EC use. Tom and Bob commented on the increasing presence of ECs in society:

Tom (Category 2) [379-380]: [...] I can't remember high street that I've not seen an e-cig shop on, they're very prolific [...]

Bob (Category 6) [118-120]: [...] I was just talking earlier about the fact there's more and more e-cigarette stores which increases a) the normalisation of it and b) if you really wanted to know – you probably not too far away from an e-cigarette store [...]

CTCs and ECs were often compared, with the latter frequently reported as more complex to use and more difficult to purchase. Many participants reported having initially feeling unsure how to use ECs. Participants discussed how device complications could be overcome by persistence and determination (Section 5.3.4.3). Beth and Paul preferred simpler EC devices:

Beth (Category 5) [41-43]: [...] Vype ones are like a really easy to use, like a starter kind of vape, you don't have to change any coils or anything you just simply buy the new vape, you buy it from the co-op and you just attach it at the top [...]

Paul (Category 1) [131-133]: [...] yeah, it's the convenience and like, how I don't fill them up I just buy cartilages, that's another thing as well b'cos when you run out of cartilage all you do is just you remove it or replace it rather so there's no fling up devices or tanks so it's, again it's a very accessible thing to do and quick, and less time consuming [...]

Daniel noted device maintenance was burdensome:

Daniel (Category 3) [336-338]: [...] I think I've kind of gone past the fad of it now, I'm kinda realising its like something I've almost gotta maintain, I've gotta change coils, I've gotta do this, do this, get juices it's a proper fad to keep it up erm so I've kinda gone off it myself [...]

Previous research has also reported that the charging aspect of ECs hindered use (Tompkins et al., 2020). Smokers and ex-smokers felt that CTCs were more costly than ECs in the long run, despite the initial expenditure for the device.

Paul (Category 1) [263-264]: [...] I think cost was a massive factor as well like buying cigarettes, having them, is almost like having a second mortgage [...]

Even non-smokers were aware that they were cheaper:

Bob (Category 6) [164-165]: [...] I guess it's cheaper – I guess? Cos again the reusability of it again you don't have to like...what's a pack of cigarettes now – it

probably – the cheapest is about seven or ten quid but I guess e-cigarettes they cost maybe 30 quid and that's it [...]

This was particularly interesting in Beth's case, as although she was never initially spending money on CTCs, she still noted the difference in price.

Beth (Category 5) [178-179]: [...] it's quite cheap, it's a lot cheaper than cigarettes, I mean it's a factor when I lose it cos I do lose it quite often but buying the things it tends to last me quite long cos I'm not doing it during the day, the stuff does last me quite long but if I go out on a weekend obviously it doesn't last me that long [...]

Although this did not always ensure that participants would stick to using them, as in Eve's case:

Eve (Category 4) [106-108]: [...] it's probably well more cost-effective cos cigs are well expensive – I think they're like nine pound a pack or something so if you go through two of them a week...it is more expensive to smoke it's definitely cheaper to use an e-cig [...]

Unfortunately, the previously discussed device inferiorities eventually led to frequently buying new parts.

Leanne (Category 2) [134-136]: [...] I think I spent a fortune on buying new coils and the glasses kept smashing and stuff then the second one I bought a really expensive one, about 60 pound I paid for it where you can turn them up and turn them down, a few of them had them at work erm, and that's the one I stopped for about three and a half, four months [...]

Previous research has demonstrated that variations in EC device prices when compared to CTCs impact smokers decisions to quit (Liber et al., 2017).

5.3.8.3 Convenience

Convenience, or inconvenience as a subtheme was captures general device understanding and subsequently physical ease of use. Secondly, this subtheme conveyed the importance locational accessibility to stores that sell ECs and related products, as well as laws pertaining to use.

For Paul, Daniel and Eve using the device indoors encouraged use.

Paul (Category 1) [104-107]: [...] I instantly became hooked on it, it was very – it was a thing I could pick up and if anything as well, it's more convenient than smoking b'cos y'know you can do it in your house, I don't have to go outside as much, which like for me, studying in my room, I could just vape in my room I wouldn't have to go outside [...]

Daniel (Category 3) [246-248]: [...] I mean they're practical and they're also – you can just have them in a lot more places like I can sit in a pub or be in a club and just have it [...]

Eve (Category 4) [53-55]: [...] I think I tried it about a year ago and I thought 'hm interesting' and then got my own, started using it quite a bit because it relaxes you at night, you don't need to go outside the house [...]

Research exploring beliefs about convenience among EC users who smoke and/or smoked, found that convenience was not associated with reduced smoking rates (Harrell et al., 2019). Rather, convenience was associated with a trend toward increased levels of smoking. Perhaps this is suggestive that the 'convenient' element of EC use allows for the maintenance of nicotine addiction where CTC is prohibited, but does not reduce CTC consumption, instead, it increases nicotine consumption (Harrell et al., 2019).

Opposingly, participants also noted that the additional components involved in successfully using an EC (liquids, batteries, charge) can make them more inconvenient than CTC smoking, which discourages use. This was an issue for both Eve and Leanne:

Eve (Category 4) [89-90/99]: [...] that's probably another reason I switched back to cigs cos it's just easy isn't it? You open your pack and light it and that's it, you're done, whereas y'know like buying the stuff, filling the liquid, I didn't realise how quick you run out, out of the liquid [...] if you run out of charge and didn't have anywhere to charge it what could you do? Whereas if you've ran out of cigs you can just go to the shop and buy some [...]

Leanne (Category 2) [149-151]: [...] it was more the inconvenience for me sometimes, being at work and then smoking it and ya coil going and then where – like when am I gonna be able to get into the town to get a new coil? [...]

For Tracey and Paul, who had also quit smoking using an EC, easily being able to buy EC parts also facilitated their quit attempt.

Tracey (Category 1) [210-213]: [...] I go to Tesco; Tesco's are open 24/7. And I know other supermarkets sell them, but because I got my first one from Tesco, I've always gone to Tesco, and y'know sometimes they don't have the top of it, and I think 'oh where am I gonna get one from?' but, then they will say 'why don't you try one of our other stores' cos I mean it's not very often that I'm at a stage where I need to go searching for one [...]

Paul (Category 1) [125-127]: [...] I've mixed between a few devices erm, so I started off on Juul and then I moved to another company called Vype and I sometimes use that device as well, the Vype device, which is very accessible to buy like Juul, any over the counter supermarket has them [...]

For smokers, the convenience of maintaining the device was an important element on final decisions on whether to continue using the device or switch back to CTC smoking.

Paul (Category 1) [131-134]: [...] it's the convenience and like, how with the e-cigarettes I don't fill them up I just buy cartilages, that's another thing as well b'cos when you run out of cartilage all you do is just you remove it or replace it rather so there's no filling up devices or tanks so it's, again it's a very accessible thing to do and quick, and less time consuming [...]

Michael (Category 6) [172-173]: [...] most of the people I know don't use them as well because they are too big, they can't fit them properly in to their pockets [...]

From this, it could be suggested that convenience is an influencing factor of EC use, although whether this is encouraging or deterring depends on the individual and their preferences.

5.3.9 Summary of Theme 4

Device related issues conveys issues relating to health implications and perceived risk relating to the device, the participants in this study appear to be unanimous that EC poses risk, but overall, less risk to human health than smoking. Discussions regarding the practical elements and how they are experienced acts as an encouraging or deterring factor. Convenience was important, this appeared to be shaped by the accessibility of places to purchase device related products, as well as ease of use, although these elements varied due to the diversity of products that are available.

5.4 Summary of Key Findings

Social context, representation and knowledge, aspects of addiction and device related issues were identified key themes in regard to factors that act as facilitators and barriers in regard to EC use. Social context exemplifies external social factors that influence decision-making about ECs. ECs were generally perceived as more socially acceptable which encourages use, although there were varying levels of acceptability within EC products themselves. Social interactions also appeared to be influential in shaping norms, attitudes, and behaviour surrounding ECs. Representation and knowledge conveys internalised comprehension of ECs and how this is shaped by external mass media, whether this was encouraging or deterring depends on the information absorbed. There was unanimity in relation to uncertainty, which highlighted the important need for psychoeducation, and consideration of cessation programmes implementing this. Aspects of addiction was constructed from participant reflections upon their addiction, each experience was unique although the behavioural- sensory elements and personal enjoyment were consistent elements that encouraged or deterred use. This highlighted the need for considerations in regard to the 'next step' for those who have quit smoking, there needs to be more guidance

on stopping EC use. The final key theme, device related issues, captures the functionality of the devices and how they are experienced individually, as well as the health implications that they pose. These have been organised into a table of facilitators (encouraging) and barriers (detering) of ECs that they can be understood in line with the aim of the thesis. Table 20 illustrates the specific aspects of the key themes and their role as a facilitator of barrier in regard to EC use.

Table 20

Thematic Outcomes from Study Two and Their Role as Facilitator or Barrier of EC Use

Facilitators of EC use	Barriers of EC use
Social context <ul style="list-style-type: none"> • Perceived social acceptability, social norms • influence of a persuasive person • Less strict regulations when compared to CTCs • Social facilitation (accurately mirror social elements of smoking) • Identifying as a vaper 	Social context <ul style="list-style-type: none"> • Influence of a persuasive person • Regulations that mirror current CTC regulations • Social facilitation (not being able to mirror the social elements of smoking) • Identifying as a smoker
Representation and knowledge <ul style="list-style-type: none"> • Promoted as a cessation device • Knowledge about the device and the functionality of it 	Representation and knowledge <ul style="list-style-type: none"> • Uncertainty regarding the risks, safety and long-term effects and how to use the device • Lack of physical accessibility to shops selling ECs and associated products
Aspects of addiction <ul style="list-style-type: none"> • Accurately mimics cigarette experience (behavioural-sensory) • Negative affect reduction • Intention to quit smoking • Strong 'willpower' / 'mind frame' to quit smoking • Personal enjoyment of ECs 	Aspects of addiction <ul style="list-style-type: none"> • Inducing/Increasing nicotine dependence • Inaccurate imitates cigarettes experience (different experience) • Personal enjoyment of cigarettes
Device related issues <ul style="list-style-type: none"> • Less harmful than CTCs • Initially cheaper than CTCs 	Device related issues <ul style="list-style-type: none"> • Inconvenient when compared to CTCs

	<ul style="list-style-type: none"> • Buying new parts becomes more expensive over time
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5.5 Conclusion of Chapter 5

Overall, this chapter provided a more in-depth insight and built upon the findings from the first study. Findings from this study indicate that facilitators and barriers of EC use are related to social context, representation and knowledge, aspects of addiction and device related issues. Largely, this study further contributes to the body of knowledge generated from Study One as it highlighted the importance of social acceptability and facilitation in decision-making around ECs. Likewise, this study has demonstrated the influence of external informational inputs on general perception shaping on ECs as well as the impact of the (in)convenience of device related issues such as maintenance cost and accessibility.

There were also particularly distinct findings from this study that had not been identified in Study One. Ideas about both personal and social identities in relation to ECs were important. Considerations of certain 'mindsets' and how they are influential in regard to health-related behavioural decisions. The varying levels of acceptability and stigma between certain devices was novel, as well as the relevance of positive odour-evoked memories. It also was revealed that social factors appeared the most influential when considering EC initiation within non-smokers.

Future research should focus on the identity cycles that exist within nicotine addiction cycles. The varying levels of social acceptability between EC products could be examined to provide a unique insight into the typology of EC irrespective of CTCs. There is a vital obligation for media outlets to disclose accurate information. The promotion of EC psychoeducation combined with peer support networks could be implemented to enhance SSS. Understanding how to assist ex-smokers in eventually discontinuing with their EC device would also be useful. The acknowledgement of the pleasure discourse also needs to be more widely understood and reflected on when considering addiction.

Strengths of this study were that a richer understanding was gained from the personal interaction and participants were detailed in their responses, sharing a large amount of information, the flexible structure allowed for expansion on issues participants felt to be important. In addition, the study has recently been accepted for publication in *Psychology &*

Health (Wilson et al., 2021), meaning it has gone through many stages of peer review. Like all qualitative research, the findings cannot be generalised outside of this study.

Socioeconomic status (SES) and gender were also not explored in this study, which is limiting, as previous research has demonstrated it has been linked to differences in perceptions of ECs (Hartwell et al., 2017; Green et al., 2020). Although, this was beyond the scope of this study which aimed to have a diverse sample to allow for maximum variation.

In light of the findings presented, the next chapter will seek to explore how people use language to communicate perceptions ECs use to contribute further to the overall aim of the thesis by understanding how encouraging and deterring factors exist in social situations. By exploring EC accounts in an environment that is socially orientated, alternative responses and may occur that would not have arisen in an OeQ or SSI.

Chapter VI – Study Three: How do adults use language to communicate perceptions of ECs?

6.1 Introduction to Chapter

The combined outcomes from both Study One (Chapter 4) and Study Two (Chapter 5) provide an in-depth and comprehensive insight into individual experience and accounts of ECs. Findings from Study One (Chapter 4) identified that social context, informative sources, practical aspects and health implications impact behaviour and opinion in adult smokers and non-smokers. Findings from Chapter 5 identified that the key factors that encourage or deter EC behaviour in adult smokers and non-smokers are related to social context, representation and knowledge, aspects of addiction and device related issues.

This chapter aims to understand how people use language to communicate perceptions of ECs, exploring how they are discussed in social situations to provide a unique method of contributing to the research aims of the thesis. This is also important when considering that both Study One and Study Two identified the importance of the social context in shaping EC accounts, as social context was identified as a key theme in both studies. This chapter uses a FG method to provide enlightenment on the contextual and social factors that shape EC behaviour and perception. This chapter will present an overview of the methodology, results, and a general conclusion to Study Three which explores the research question: How do adult smokers and non-smokers use language to communicate perceptions of ECs?.

6.2 Method

6.2.1 Design

A qualitative research design was utilised using FGs which have been justified in Section 3.7. FGs were conducted with a range of participants across categories (discussed and justified in Section 3.3.1.2). Two FGs were conducted with 10 participants, four participants took part in the first FG and six participants took part in the second FG.

6.2.2 Participants

The original aim for this study was to conduct six homogenous FGs and one heterogenous FG, one FG for each participant category (description and justification of participant

categories can be found in Section 3.3.2) and one mixed group with participants across categories. The aim was to have around four to six participants in each group as recommended and justified by Krueger and Casey (2014). The benefits of using heterogenous groups have been discussed in Section 3.5. The addition of homogenous groups may have stimulated discussion that may not have occurred in the heterogenous groups as some claim that homogenous groups add a level fluidity and depth to discussions due to the similarity of participants (Roller and Lavrakas, 2015). Homogenous groups also offer a level of security that heterogenous groups do not, for example, participants may feel more comfortable sharing their perceptions with people who have 'equal power'. It would have also been advantageous to include both types of FGs as this would allow for comparison between how ECs were discussed in both to understand the power attached to different EC/smoking discourses. However, due to the outbreak of the Covid-19 pandemic, recruitment issues and time limitations, the researcher decided to conduct two heterogenous groups as these groups were a pragmatic choice due to the limited time and financial resources the researcher had (Roller and Lavrakas, 2015).

Participants were recruited using opportunity sampling; inclusion and exclusion criteria are discussed and justified in Section 3.3.1.2. In total there were ten participants, three males, seven females. Age ranged between 26-47 with a mean age of 30.6. It important to point out that there was no overlap in the sample of participants in Study One, Two or Three. All three studies had a unique sample of participants. Summary of participant demographic information is illustrated below in Table 21, followed by the details of the participant categories in Table 22. Goodman (2017) emphasises that whilst a large amount of data is impressive, DA is time consuming, it is therefore important to not become 'swamped' with data. This justifies the researcher's decision to conduct two smaller FGs. Morgan (2009) and Krueger and Casey (2014) have justified the use of smaller FGs with four to six participants.

Table 21

Summary of Participant Demographic Information Study Three

Demographic Variable	Number of Participants	Percentage of Participants
Age (in years)		

Median: 30.6

Range: 26-47

Gender

Male	3	30%
Female	7	70%

Ethnicity

White (Northern Irish/British/Irish)	10	100%
Mixed/Multiple ethnic groups	0	0%
Asian/Asian British	0	0%
Black/African/Caribbean/Black	0	0%
British		
Other Ethnic Group	0	0%

Table 22

Details of Participants in Study Three

FOCUS GROUP 1			
Pseudonym	Age	Gender	Category
Barbara	32	F	1 Ex-smoker – quit with ECs
Mary	30	F	2 Smoker tried to quit with ECs
Vic	47	M	6 Non-smoker – quit without ECs
Poppy	38	F	3 Dual User
FOCUS GROUP 2			
Daisy	26	F	3 Dual User
Simone	26	F	3 Dual User
Tony	27	M	1 Ex-smoker – quit with ECs
Dominic	26	M	3 Dual User
Sophia	26	F	6 Non-smoker / Non-vaper
Valentina	28	F	3 Dual User

6.2.3 Procedure

Upon obtaining ethical approval from the faculty academic ethics committee at MMU (EthOS Reference Number: 11915), participants were identified by responding to the recruitment media (discussed in Section 3.3.1.2) which required emailing the researcher to express their interest in partaking in the study. Prospective participants who responded with a declaration of interest were sent an electronic version of the information sheet to be fully

informed of the study before agreeing to consent. The researcher and participants discussed convenient locations for the FG. Due to the nature of FG research, convenient times had to be between participants instead of just the researcher and participant. This was achieved through Doodle⁴, a free to use service that can assist with finding convenient times for group meetings and schedules. As previously discussed, the second FG was conducted online using Zoom. The justifications of this online form of data collection have been discussed in (Section 3.7.1). The procedural processes differ slightly, the differences are highlighted below (Section 6.2.3 and Section 6.2.3.1)

During the face-to-face FG, participants in were given the opportunity to re-read the participant information sheet before providing informed consent. After participants had provided informed consent, they were provided with a demographic information sheet to complete, as well as a sheet containing a list of the participant categories which they were asked to self-identify with. It was repeated to participants that they did not have to answer all questions, and they could leave at any point without providing an explanation. Participants were also informed that involvement was voluntary. Participants were reminded that because of the nature of FGs, confidentiality cannot be guaranteed, but they were asked not to repeat what has been said in the FG to others. Participants were also reminded that their responses would be audio-recorded, transcribed and potentially incorporated anonymously within the final report and submitted for publication.

Before beginning the recordings, participants were engaged in semi-formal chat and were given an opportunity to ask questions before proceeding with the discussion. Participants were informed of the ground rules (outlined on the discussion guide in Appendix 8) and reminded of the key elements of the research. When they seemed relaxed, the researcher asked permission to begin recording and the FG started. The FG was recorded using a Dictaphone. The researcher, who acted as the facilitator started the recordings by asking participants to introduce themselves by sharing their chosen pseudonym and the participant category they self-identified with. Once data collection had finished, participants were thanked, de-briefed and reminded of their right to withdraw their data. No participants in this study asked to withdraw their data.

⁴ <https://doodle.com/free-poll>

6.2.3.1 Online Focus Group

There were slight differences in the procedure for the online FG. Similar to the face-to-face discussion, relevant documentation (information sheets, consent forms) were sent via email after participants had initially responded with a declaration of interest. Instructions for using Zoom were also sent to participants before discussion as this was the chosen platform. Due to ethical requirements of online research, participants had to provide verbal consent over the phone before partaking in the research. Therefore, the researcher had individual phone calls with all six participants in the second FG to obtain consent. Due to the online nature of this study, participants were sent the demographic and categorisation sheet before the FG via email. Participants were asked to return the demographic sheet to the researcher before the group discussion and were asked to self-identify with the participant categories as they would be asked to disclose this information at the beginning of the FG. The same procedural strategies were used as discussed above (engaging participants in semi-formal chat, informing participants of ground rules, asking participants to use pseudonyms etc.). Participants were made to feel at ease and reminded of the ground rules as well as the key elements of the research. Once participants were conformable the researcher started the recording using a Dictaphone (no video recording was used). It is important to disclose that although no video recording was used, all participants kept their cameras on. Once the discussion had finished participants were thanked and de-briefed. As mentioned above, no participants requested to withdraw their data.

6.2.4 Data Collection

The data were collected between January 2020 and May 2020. The researcher conducted group interviews with ten participants spread across two groups. The same pre-determined discussion guide was used (Appendix 8) throughout both FGs which was important in ensuring rigour, as both FGs had the same structure and were asked about the same topics. The discussion guide was developed following Willig's (2013) guidelines for devising guides that fit the discursive interests of the study, alongside guidance from literature, considerations regarding the outcomes from the previous two studies and support from the supervisory team. The first section of the discussion focused predominantly on introductory questions, to build trust and rapport between participants and allow them to disclose, and explain the context of, the category they identify. This included questions such as 'could

you all discuss the first time you used/noticed ECs' and 'what do you think are the positives/negatives of ECs?'. The researcher had minimal input, facilitating and providing the questions/topics for the participants to discuss. This was particularly important in terms of intersubjectivity as it allowed the researcher to observe the verbal social interactions and creation of meaning between participants (Anderson, 2012). Discussion then centred on beliefs surrounding ECs (positive, negative, comparisons with CTCs), EC experiences (current and previous experiences), and contextual influences of ECs (policy, health implications, etc).

The FG concluded with the researcher asking some reflective questions to the participants about the process of the discussion, such as 'as a group, can you come up with three words to summarise what you have discussed today?'. Participants were also invited to provide any additional information which had not been covered. Both FG sessions lasted between 45-73 minutes and were closed when the conversation 'dried up' naturally. Following the completion of the discussion, participants were thanked, de-briefed and sent a copy of the de-brief to their email.

6.2.5 Data Analysis

The following section will discuss the detailed procedural steps involved in conducting the analysis (discussed and justified in Section 3.8). In line with Potter (2004), the procedural summary of the analysis can be found below in Figure 10. The analysis was guided by comparative work by Willig (2013) as well as elements of discursive psychology.

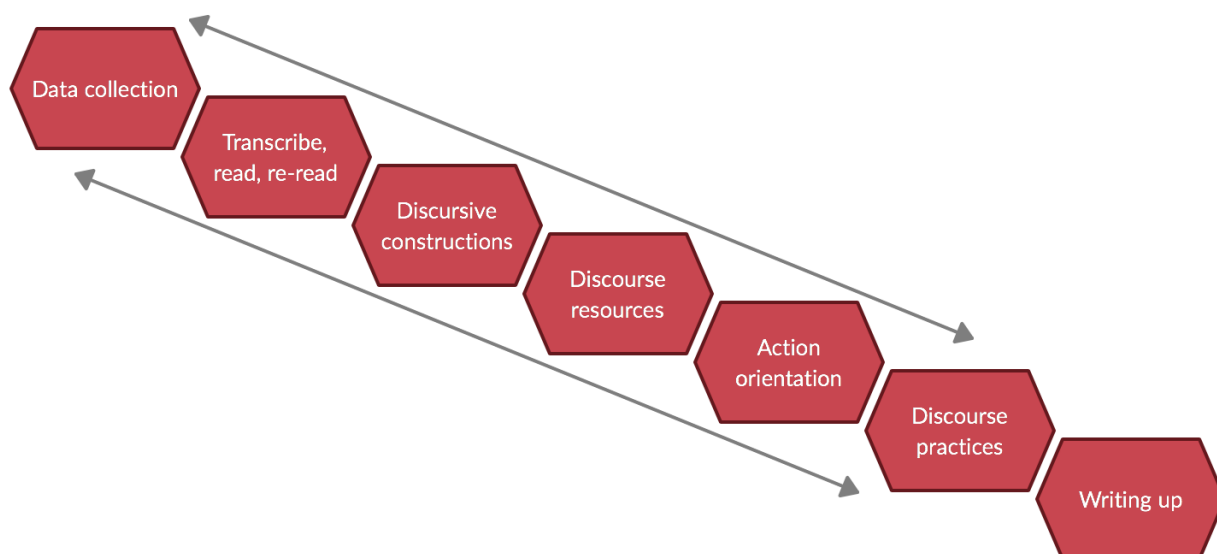


Figure 10 – Diagram Illustrating the Procedure of Data Analysis in Study Three

The analysis was open-ended and iterative, hence the arrows in the diagram. Each step in the analysis and how they ensured structure and rigour during the complex process, is discussed below. The data collection element of the procedure has been described in Section 6.2.4.

6.2.5.1 Transcription

The researcher recorded, transcribed and analysed the FG data, meaning they were deeply familiar with the data analysed. Both discussions were transcribed the day after they had taken place. The recordings were listened to more than once, ensuring there were no misinterpretations of words or major typing errors. Re-reading transcripts ensures familiarity and is part of an iterative analysis process. FGs were transcribed verbatim, with simple accessible transcripts produced. This form of transcription contrasts from more detailed methods adopted by other discourse analysts such as the Jefferson transcription method (Jefferson, 2004). Simple accessible transcripts were chosen over the Jefferson transcription methods as they are a pragmatic choice for researchers working with limited time and resources (Roller and Lavrakas, 2015). A simpler transcription procedure still

allowed the researcher to hear, interpret and construct analytical accounts of the discussion. Transcripts were anonymised to protect the identity of participants both during and following the analysis process. Enhanced information (e.g., to explain the context of the quote) is presented within square brackets. Participant pseudonyms are also followed by information regarding their EC/smoking experience in square brackets. Line numbers were also used to assist the interpretation.

6.2.5.2 Discourse Constructions

In a linguistic sense, discourse constructions are related to the structure of the interaction between participants, for example, how they take turns, how they disagree or how they offer their comment, rather than the subject matter of the interaction. How participants constructed their comments around ECs were focused on here. Particular attention was paid to understanding the ways in which ECs were discursively constructed and assigned meaning through shared interactions.

6.2.5.3 Interpretive Repertoires

Interpretive repertoires can also be understood as ‘what everyone knows’ (Goodman, 2017). They are linguistic descriptions, concepts and arguments found in talk that are familiar and recognised (Potter and Wetherall, 1987). They are often drawn upon to strengthen arguments and make the speaker more persuasive. It is important to point out that many interpretive repertoires can be used in conversation, and often they can be contradictory (Goodman, 2017). When conducting a DA, it is important to explore when opposing repertoires are used by the speaker, and how they contribute to varying interactional goals (Goodman, 2017).

6.2.5.4 Subject Positions

Subject positions are how speakers construct and present themselves, as well as others, in discourse, they can also be understood as a matter of identity. Identity and category membership is fluid in discourse, and it is important to pay attention to how identities are constructed and invoked in conversation (Goodman, 2017).

6.2.5.5 Ideological Dilemmas

The previously discussed contradictory repertoires and subject positions can be useful in understanding ideological dilemmas. Ideological dilemmas occur when conflicting ideas are negotiated, often in the form of interpretive repertoires (Goodman, 2017). For instance, in this study, participants talk about two contradictory constructions of ECs: how nothing is known about them, but at the same time how it is known that they are safer than CTCs. They can also be identified when people use disclaimers (discussed below in Table 23).

6.2.5.6 Discourses and Discourse Resources

Once elements of talk that contribute to the construction ECs had been identified from the transcript, the differences between them were explored. In an attempt to understand meaningfulness through discursive resources, attention was given to the cultural forces that impact linguistic decisions. In some instances, some discursive constructions were assembled in different ways within the same discussion as the participants drew on different resources.

6.2.5.7 Action Orientation

This involved understanding the impact of the of previously discussed constructions of ECs and what they achieve and accomplish in talk. Specific attention was paid to the implications of the interactions between participants and the functions of choice of language. An example of a question that was asked in regard to the data included: 'what is the participant trying to achieve by saying this in this specific way?'. Particular attention was given to what participants said, why they did not say other things and why they selected certain words.

6.2.5.8 Discourse Practices

Relating to action orientation, discourse practices are related to the wide array of interactions that can happen during talk (Potter, 2012). Discursive practices allow participants to situate themselves within the norms of the discourse being discussed, therefore prescribing to and being prescribed by shared meanings in a reciprocal nature (Willig, 2013). Examples of discursive practices are discussed in the following sections.

6.2.5.9 Stake Management

Stake management in talk relates to discursively managing one's motives, desires, interests and allegiances. For example, organising talk in a particular way to present a version of events that can be heard and perceived in a specific way (Edwards and Potter, 1992). In the analysis, stake management using language was considered by exploring how speakers took particular subject positions when discussing ECs.

6.2.5.10 Discursive Devices

Discursive devices are related to the purpose of words and how they function together when they are used in conversation (Edwards, 2007). Table 21 presents examples of common discursive devices.

Table 23

Discursive Devices

Device	Description	Reference
Listing/three-part lists	Used to add detail, authenticate, generalise or normalise	Jefferson (1991) Drew et al. (2006)
Discourse markers	Filler words such as 'y'know', 'well' and 'so' used as topic changes, emphasis, reformulations, talk planning	Schiffrin (1987), Cameron (2001)
Disclaimers	Acknowledging an unacceptable interpretation and denying it to prevent the listener interpreting the talk in terms of the unacceptable element	Potter and Wetherell (1987)
Pronouns and footing	Exploring the purpose of the pronouns used and what function that pronoun has in the given sentence	Goffman (1981)
Active voicing	Reporting what others have said (for example, 'the prime minister said') to construct corroboration. Citing conversation also provides detail, which can increase the perceived legitimacy of the account (however, there is never certainty in the accuracy of what is being said)	Hutchby and Wooffitt (1998)

Extreme case formulations	Words such as 'very' or 'extremely' which can strengthen or justify sentences	Pomerantz (1986)
Detail and/or generic vagueness	Using detail to increase authenticity, or alternatively being particularly vague	Potter and Edwards (1997) Edwards (2007)
Honest phrases	Often used to make an account appear more genuine and authentic	Edwards and Fasulo (2006)
Hedges	Often used when speakers and writers signal caution, or probability, versus full certainty	Lakoff (1972)

6.2.5.11 Writing up the Analysis

The findings from the analysis were written up, and the taken-for-granted assumptions within the discussions were questioned. Attention was paid to how participants co-constructed the social reality when in conversation. Whilst the steps of analysis presented above are clearly defined, the process of analysis was iterative to capture the complexity of accounts.

6.3 Findings and Discussion

The findings presented below are discussed in relation to the question: 'how do adult smokers and non-smokers use language to communicate perceptions of discourse?'. The discursive approach aimed to understand how EC accounts are co-constructed and legitimised in a social (FG) context. Using data from two FGs, this section aims to present use of language as they defend and discuss their accounts. The discussion will also link ECs with theory, practice and wider psychology to further understand how ECs are constructed socially, and how and why these stances may differ. As anticipated, the ways in which the participants talked about ECs and their experiences were complex and sometimes contradictory, although discussions did not feature explicit conflict or disagreement. ECs were constructed by the participants' choice of description and the associations it implicitly makes.

The analysis proposes two main discursive frameworks that participants draw from to communicate their perceptions of ECs. These are: (1) The Uncertainty and Risk framework

and (2) Social Acceptability and the Stigma Spectrum framework. These frameworks are not complete representations of how people use ECs to communicate perceptions of ECs and therefore do not unearth the whole 'truth' about EC use and patterns. They can be defined as resources by which participants selectively draw from when presenting themselves and their behaviour when rationalising and justifying their EC accounts (Potter and Wetherall, 1987).

6.3.1 Uncertainty and Risk Discourse

In the discourse of uncertainty and risk, ECs were discussed as (1) 'healthier' and (2) 'safer'. However, at the root of this discourse was the claim that there was still a significant amount unknown about ECs ('it needs to be clearer', 'we don't know').

[Lines 170-190]

Researcher: Sorry, what are you saying the biggest negative is?

Dominic (dual): general lack of education on it, kind of

Sophia (non-vaper/smoker): yeah and I think as well like there was a study that came out a while ago that was like if you use them, they give you popcorn lung and -

Valentina (dual): [yeah, I saw that]

Sophia (non-vaper/smoker): it's like what is popcorn lung? Like, what is that? What does that mean? It sounds ridiculous but at least, it's ridiculous, but at least with cancer you know what you are getting, and at least with COPD you know what you are getting, with popcorn lung it's like what is that? It's like popcorn sounds cute, it doesn't sound like it's a problem, do you know what I mean? Like I feel like that doesn't, probably doesn't help like in terms of contributing to the narrative that they are harmless compared to cigarettes even though there is a health risk associated with it, it's hard to like I dunno for me, I find that hard to put into context because I don't know what it is

Valentina (dual): yeah

Simone (dual): I think people are happily oblivious until they are shown like the hard, the true hard facts about things, if you just kind of slightly hint toward something being bad, people aren't going to take that seriously

Valentina (dual): [and I do think as well]

Dominic (dual): [we don't know what the worst-case scenario is] like by the way this is how bad it could get, or you might be fine

Valentina (dual): yeah

Sophia (non-vaper/non-smoker): I think cos it's definitely it's the lesser of two evils as well, I think to some extent whatever you say about e-cigs and even if that is backed up with good solid data, if it's not as bad as cigarettes, y'know people are always gonna be like y'know it's the lesser of two evils

In the above extract, the modifier 'kind of' by Dominic implies impartiality, softening the sentence so it does not appear too exact, which indicates that he (the speaker) did not feel confident in the accuracy of the information he was discussing. Note the use of three-part list of rhetorical questions by Sophia, 'What is popcorn lung? Like, like what is that? What does that mean?'. As discussed in Section 5.3.8.1, one of the most commonly held concerns regarding ECs is that they could cause 'popcorn lung' (PHE, 2019). Listing provides speakers with means to position themselves in relation to items on the list, also known as an 'orientated-to-procedure' (Jefferson, 1991). However, the function of listing in the form of rhetorical questions presents an interesting discursive technique. Although the questions could appear information seeking, the repetition of similar questions emphasises the notion of uncertainty.

Rhetorical questions exemplify utterances whereby the form does not match the function, by mimicking the structure of a question but with the force of an assertion. For this reason, it is generally assumed they neither truly seek information or answers and therefore have been previously defined as bias assertions (Sadock, 1971). Rhetorical questions are understood as bias assertions when they have blatantly obvious or similar answers. It appears that Sophia was not seeking an answer, as she continued to speak following the questions. This discursive strategy was used to emphasise her point about the expansive list of unknown answers about popcorn lung and subsequently ECs.

She also continues to repeat 'at least' and 'you know what you are getting' when discussing smoking-related illnesses such as cancer or COPD, to further emphasise that although smoking-related illnesses can be fatal, it is better to partake in an activity (smoking) where the potential consequences are better understood, than an alternative activity (EC use) where the consequences are uncertain. The perceived risk element of the health belief model (HBM: Rosentock, 1974) could be reflected on here, as health decisions require risk calculation and prediction. Uncertainties therefore impact risk assessments and subsequent decision-making around ECs. However, she later goes on to state that ECs are 'definitely

the lesser of two evils' (Sophia, non-vaper/smoker, FG2), contradicting her previous assertion, presenting an ideological dilemma. The word 'evil' has no positive connotations, as by definition it means the absence of good. It could be argued this reflects Sophia's position as a non-smoker/vaper as she cannot see the potentials of ECs in regard to THR. However, 'the lesser of two evils' has been commonly used in public discourse surrounding ECs (Shapiro and Kaynar, 2016), so this could just be a reflection of Sophia's absorption of media discussions.

Simone demonstrates interest exposure, when she states that 'people' are happily oblivious and don't take things seriously. This change in footing (Goffman, 1981) presents change in the alignment she takes to herself and the others, by negating any personal criticism and explicitly stating that this specific element of her account is not driven by personal experience. The use of the word 'people' instead of 'I' makes the speaker (Simone) appear more objective, unbiased and trustworthy. Simone states this is what others do, not herself, as she does not want to make any bold claims. *Discipline and Punish*, by Foucault (1977) could be considered here. The symbolic 'panoptic gaze' can be linked Simone's talk about the judgement of others. Her comments allow her to regulate and vocalise how her practices are in line with societal norms, managing her stake in the process (Potter, 1996).

Simone is uncertain of how they will be perceived due to the general underlying vagueness surrounding ECs, and therefore she does not want to make any claims that may be viewed as unacceptable by the group, it is her way of remaining neutral. Conceptualised meanings of the self when opposed to the other (Holloway and Jefferson, 2013) can be reflected on here. Defining others as 'bad' is a common technique used in talk to frame oneself as 'good', deflecting criticism and projecting a positive self-image. There are also elements of blame in Simone's talk, she blames a particular group/people (those who are oblivious) whilst elevating herself, which is contradictory, as in alternative extracts she admitted that she is also unaware of certain elements of ECs. The 'defended psychosocial subject' termed by Holloway and Jefferson (2013) provides an understanding of the way people negotiate meaning with talk, with an emphasis on devices they use to defend or dismiss their actions in uncertain situations.

Dominic also states 'we don't know what the worst-case scenario is'. The use of the pronoun 'we' presents an engagement strategy by proposing a collective perspective on this issue of general uncertainty. It implies a sense of commonality with the other FG

members, a common identity that seeks to unite those categorised, strengthening the co-constructed discourse that there is uncertainty surrounding ECs. This has also been demonstrated in the extract below when Mary states 'we need to know'.

[Lines 247-262]

Mary (smoker): No, no I don't know cigarettes are becoming less socially acceptable now, I think it is far more OK to vape than it is to smoke

Poppy (dual): and I don't think kids realise the risk of vaping whereas they do with smoking, y'know so they will go on to a vape thinking it just looks really cool and it's gonna be, not realising that it's just as addictive really, and I'll be honest like, I've noticed the difference, so I had pancreatitis and when I smoked it used to cause massive pain to me erm and since like I've stopped it and even when I was using the vaper pipe it was the same, it had the same effect on me I was in pain all the time, and now, touch wood, since I've stopped using the vape, I'm not in any pain at all with my stomach. So, the fact that it was doing that to me tells you, it's not....it's not doing good things

Mary (smoker): I think it needs the same health warnings that...or we need to know what the health implications are, like smoking has got all the nasty pictures and all the health warnings and as a smoker I just ignore them because -

Barbara (ex-smoker): Well, you don't even think they are going to happen to you, do you?

Mary (smoker): but I don't think enough is known about e-cigarettes and the potential dangers but if that was known and publicised it would be better

Poppy (dual): Yeah

In this extract, Poppy uses extreme case formulations, stating she was in pain 'all the time' when using ECs but now she has stopped EC use, she is not in pain 'at all' (minimising), shedding a negative light on ECs and solidifying her position on them. However, she then goes on to use the expression 'touch wood' which is often used superstitiously to avert the possibility that something just mentioned (if bad) might not occur, or (if good) might occur; in this case, illness diagnoses and outcomes are related to luck rather than a consequence of health-related behaviours, or genetics.

The notion that illness or diagnoses are some form of mythical or unexpected event is further emphasised when Barbara states ‘well you don’t even think they are going to happen to you, do you?’, implying that although health warnings are clear, it is still common for others (you) to ignore and/or not believe the warnings. Fear appeals leading to cognitive dissonance has been discussed previously (Hansen et al., 2010). Research has shown that fear-inducing graphic warning labels can lead to defensive responses and dissonance (Müller et al., 2019). Barbara (ex-smoker) also defends her stake, using ‘you’ instead of ‘I’, as in this instance as she is speaking to Mary (smoker), positioning herself as separate from others (you) who ignore health warnings related to smoking, this could also be related to stigma surrounding smoking (Section 6.3.2).

[Lines 132-148]

Poppy: I think that’s it, like you are just starting to hear stories now like a young lad had a double lung transplant cos the oil had solidified on his lungs

Vic: Oh right

Poppy: and then obviously there was one where it exploded –

Barbara: exploded in his face!

Poppy: and in his pocket , so ya kind of hearing horror stories and ya thinking is this actually better than a cigarette?

In the extract above Poppy uses the word ‘just’ when describing a double lung transplant, indicating that serious illnesses are only ‘just’ coming to light, indicating that before this, there was uncertainty. The use of the word ‘just’ could also be interpreted as an ordinary description (Sacks, 1992; Edwards, 2007) which seems ironic when considering the seriousness of a double lung transplant. Barbara uses a similar strategy when she uses the word ‘obviously’ when describing an exploding EC. Using the word ‘obviously’ infers certainty with EC explosions which has been normalised as ‘taken-for-granted’ knowledge (Sacks, 1992). These discursive devices present the idea that these extreme repercussions of EC use, lung transplants in the young and explosions, are expected outcomes of EC use. This takes away the seriousness of these risks, as this extract appears rather casual for a discussion on such serious risk, it brings in to question whether they believe it or not. It also echoes reactions to the previously discussed fear appeals. The ordinary use of language and how it reflects society’s greater views on the practice of EC use could be interpreted in two distinct ways. It could be it suggests there is a general naïve consensus surrounding

ECs, but arguably it could also suggest blissful unawareness. Either way, it emphasises general uncertainty.

Participants were commonly contradictory when discussing the current regulations of ECs: 'just make them like cigarettes, make it more difficult to get and make it more...warnings on the packets' (Dominic, FG2). These types of contradictions from participants manifest uncertainty, which is understandable, as risk statements on warning label packages also increase ambiguity (Katz et al., 2017).

[Lines 277-292]

Mary (smoker): I think they are viewed as healthier though, people like, have quit smoking and are using the e-cigarette and feel like that is a healthier option, but is it? And I don't know whether we really know that

Poppy (dual): and I think it's all the other things as well like you stink when you smoke but you don't when you are using the e-cigarette, erm y'know it's like certain things like even though I was a heavy smoker if I was walking down the street I would not smoke a cigarette because I thought it looked common. And I don't know why I thought that because I have no problems smoking my vape

Researcher: you've all mentioned a few times there the vape being more socially acceptable. Why do you think that is?

Barbara (ex-smoker): because they have said that its healthier for you, so people think they are doing well, but I think we all know that the media only publicise what they want you to know and what they want you to believe so I think it's very media driven

Mary (smoker): it doesn't have that smell to it either and it doesn't like, if you blow cigarette smoke at somebody, they are gonna smell, they are gonna – whereas if you are puffing away on your vape that's gonna – it's just the vape that comes out

Vic (ex-smoker): it's more user friendly, isn't it?

Mary (smoker): it doesn't create a cough in people...or at least I don't think it does anyway

In the extract above, Mary uses the word 'viewed' instead of alternatives such as 'are' healthier, demonstrating that although this is generally understood, she does not necessarily view it as the truth. This is confirmed when she goes on to rhetorically ask 'but

is it?'. She also states, 'we don't really know', implying the collective response of uncertainty for the whole group as previously discussed. It appears throughout both extracts the use of the word 'we' was used when participants made statements about not knowing/needing more information. In alternative extracts, phrases such as 'for me personally' or 'at least that's my relationship with it' were regularly used to highlight an understanding that everyone's experience varied. Participants make it clear that they are not discrediting or judging others' experience. So, it is telling that 'we' was chosen when discussing uncertainty. The active voicing strategy (Hutchby and Wooffitt, 1998) used by Barbara when she stated, 'they said' contributes to ambiguity, as she can't provide the details of 'who said what,' demonstrating the inauthenticity of EC information sources.

Discourse markers (y'know, I mean) are also used in the above extract by Poppy and are used commonly throughout both FGs, emphasising the uncertainty discourse. These types of markers play a major role in progressing participant knowledge about the world, as knowledge about certain issues becomes less certain. Speakers use 'y'know' to enlist hearer agreement, confirmation and affirmation of the receipt of information (Schiffrin, 1987). Seeking confirmation from others is a clear indication of lack of confidence in knowledge. By posing these markers, the speakers are discursively including the other group members into their understanding.

The use of confirmation checks in the extract above 'it's more user friendly, isn't it?' (Vic, ex-smoker, FG1) and throughout both FGs: 'the market has evolved, hasn't it?' (Sophia, non-vaper/smoker, FG2), 'it seems as though it's like a trend, isn't it?' (Vic, ex-smoker, FG1), 'it's very stereotypical, isn't it?' (Barbara, vaper, ex-smoker, FG1) 'it's an investment, isn't it?' (Sophia, non-vaper/smoker, FG2), 'it's like a commodity, isn't it?' (Tony, ex-smoker, FG2) were common. This form of confirmation check asks the hearer to concur that the first statement is true. Sometimes, it is obvious the statement is true and these devices (hasn't it/isn't it) can also be used as invitations, inviting the hearer to continue the conversation. In this instance, they were used to expand on the co-constructed knowledge of ECs. Long (1980) claims confirmation checks are often used to seek confirmation that the utterance had been correctly understood or correctly heard by the speaker. They are linguistic tools used by those learning English as a second language, seeking confirmation that their use of English is correct. In this instance, it could be suggested that this could either be because the speaker is open to alternative viewpoints or confirmation about the subject. This

discourse contributes to the underlying sense of uncertainty regarding ECs, as speakers are keen to further develop their understanding by conferring with others in the group.

Hedging, the use of conditionals ('it might be much worse than we think' [Simone, dual, FG2]; 'you could have been having 5 cigarettes really' [Barbara, ex-smoker, FG1]) and modifiers (adverbs; 'they probably wouldn't think to use them' [Mary, smoker, FG1]) are used throughout both FGs. Hedging is a negative politeness strategy which marks the statement as provisional, awaiting acceptance by the hearers and does not impose certainties. Hedges are usually verbal and adverbial expressions (may, could, perhaps), used in talk when dealing with degrees of probability. They serve as an interactive bridge between interpretation and initial propositional information (Gribanova and Gaidukova, 2019).

There are two main reasons as to why hedges are used in speech. The first is to soften speech for politeness and to express uncertainty. The second is to communicate in an unobtrusive way. The use of hedges by the speakers demonstrates either an intention not to be precise, avoid further questions or an unwillingness to tell the truth (Lakoff, 1972). This could be because in this instance, they feel they do not know the 'truth'. These techniques allow participants to deflect the power away from themselves as they do not want to be responsible for making bold statements regarding ECs.

In a summarising point, toward the end of FG2, Dominic states 'I think it's even established that most of us here use e-cigs daily and it's actually quite frightening that none of us know really anything about them'. The use of the extreme case formulations that 'none' of the group knows 'anything' firstly presents the absolute condition that no-one knows anything, which itself is contradictory as throughout the discussion each member has contributed and demonstrated some element of awareness. He also again uses the pro-noun 'us' to present this collective response on the issue. Thus, what is noticed throughout both FG discussions is a co-constructed account of a perfect example of opposing ideological dilemma: the acceptance that ECs are healthier and a more socially acceptable means of smoking, but also that there is not enough information about them.

This echoes findings from alternative research, which demonstrates that users and non-users alike feel there is limited available knowledge which in turn impacts decision-making around EC use (Pisinger and Døssing, 2014; Farrimond, 2016). It appears that for many on

both sides of the EC debate, information can sometimes be exaggerated leading to extreme beliefs and confusion. These elements of hyperbole can also be noticed within their own talk.

6.3.2 Social Acceptability and The Stigma Spectrum Discourse

In this discourse, participants presented addictive behaviours on a spectrum and discussed where ECs lie along this spectrum.

[Lines 256-283]

Simone (dual): I haven't accepted the fact that I've got a problem, I just, I know that I should quit but I'm not really willing to do so, so e-cigarettes are sort of me telling myself, oh I do need to quit so I'm doing this, but I am still smoking, in fact, whereas if I just started having patches I wouldn't be smoking, so that is like true admittance that I do need to quit

Dominic (dual): Also, where you get them from like you have to get tablets and patches from a pharmacy or like boots or something whereas you can go to a really cool vape shop and there's like oh there's loads of flavours and stuff whereas you'd have to go to the bloody pharmacy and say have you got any patches in, it just feels more horrible [...]

Simone (dual): Also, I was gonna say if you go to the doctors and you say that you are trying to quit smoking, they will prescribe one of these methods, where I don't think they will prescribe them for e-cigarettes

Researcher: what do you think it's the issue with admitting you have a smoking problem?

Valentina (dual): for me, it's not that it's embarrassing, it's more that if I admitted it, it would mean that I would have to stop or I would have to be taking the measures to, because that comes with admitting there's a problem, if you admit you have a problem, by the very definition of problem, there's something not right so therefore you have to do something about it, so if I think oh I've got a problem because I'm smoking I've got to do something about it, it's not the embarrassment, it's the fact I'll have to stop smoking

Tony (ex-smoker): I think it's just the enjoyment of it as well, kind of like the more positive and the pleasure of it outweighs the negatives at the moment, well not for me, but that's kind of what I was feeling when I was dual using, was that I didn't think

it was worth it, and then other than the last few months when I have started doing more fitness and stuff like that and running more, I've kind of made more of a conscious decision to stop smoking

Simone (dual): I think social pressure is a huge thing as well, if your entire friendship group is socially smoking whenever you have social events then you're not gonna feel as pressured to stop smoking but if everyone did stop smoking you would probably stop smoking because no one around you would be and you would realise how much it is a negative thing

Simone discusses 'true admittance' and how ECs can act as some form of middle ground between quitting and continuing to smoke. Self-deception and admittance of smoking behaviour has been noted in other research exploring why young adults continue to smoke despite knowing the risks (Gough et al., 2009). She goes on to state 'if your entire friendship group is smoking' which implies her decision to smoke is a product of the behaviour of others, inferring that individual personality and characteristics are irrelevant when it comes to smoking. The statement attempts to convey that individual smoking behaviour in social situations is solely influenced by whether others are also partaking in that behaviour. Elements of social modelling could be considered here (Bandura, 1977b). It is an attempt to shift responsibility around her decision to smoke, allowing her to avoid shame or self-stigmatisation, as a result of current anti-smoking culture which assigns the 'pariah status' to smokers (Gough et al., 2009). Some participants therefore positioned themselves where they can be perceived as 'social smoker/non-addict' rather than 'addict'. This firstly puts them in a position of power as it implies they are more in control of their CTC use when compared to a 'full time smoker' and an 'addict'. It is also an attempt to avoid internalisation of the social vilification that is often associated with addiction (Matthews et al., 2017).

Also note the negative repetition of 'problem' throughout Valentina's statement. Her reluctance to state what the problem is by verbally covering it with the word 'problem' rather than explicably stating it, supports the narrative about refusing to accept or even acknowledge addiction. Valentina also states that if she accepts the problem, it is a 'fact' that she will have to stop smoking. Often, those that label themselves social smokers rather than addicts do so as to separate themselves from the negative consequences of regular smoking and accepting addiction (Schane et al., 2009).

In alternative extracts participants attempted to minimise the therapeutic value methods of NRTs on smoking cessation as a way of concealing their addiction. Dominic discusses how it's 'cooler' to have an EC than use NRTs. Some NRTs were laughable '[laughs] yeah, let's go outside together and stick a patch on' (Valentina, FG2) and were associated with a lack of personal control, 'with like chewing gum or the patches and also it's kind of like, you're in control when you're using an e-cig' (Tony, FG2). However, it could also be argued that minimising the value of NRTs helps to justify personal choices regard to THR.

The absolutes used in an alternative extract by Dominic, 'always', 'never', capture the language of extreme magnitudes and propose absolute conditions when it comes to either being a smoker or not being a smoker. This can negatively influence cessation efforts, as typically individuals smoke on the journey to permanent quitting (Gökbayrak et al., 2015), often fluctuating between quitting and smoking. This means that this exclusive mindset (smoker vs. non-smoker) as a result of stigmatisation can often be problematic. For some, vaping can be experienced as substantially different from smoking, whilst also maintaining some aspects of addiction, suggesting that addiction and control can be experienced as co-existing (Keane et al., 2017).

Stigmatisation also exists exclusively within EC products. It appears that within both FG groups there was a consensus that certain EC devices are more acceptable than others, and there is implicit distinction between the more socially acceptable 'smaller and thinner' (Tony, FG2) EC devices that blow small clouds and are only used for stopping smoking purposes, compared to the 'big massive things where they have smoke coming out' (Poppy, [FG1]) or 'big daft e-cigs with loads of clouds coming off it' (Dominic [FG2]). It was also desirable for EC use/devices to be considerate of others ('it doesn't have that smell to it either and it doesn't like, if you blow cigarette smoke at somebody, they are gonna smell' [Mary, FG1]).

[Lines 314-329]

Barbara (ex-smoker): yeah, I find that very strange all the recreational use

Mary (smoker): yeah it's very bizarre, I do – I think like I just said if it was marketed as more of a quit smoking aid, like nobody is gonna go in and buy nicotine patches if they aren't trying to stop smoking

Barbara (ex-smoker): you wouldn't go arrange to meet 100 people and smoke 20 cigarettes, would you?

Poppy (dual): it's weird as well because if you look at the person and the actual vape type they have, because you will usually find the girls will have the smaller one with the pretty colour and y'know the guys who will have the grunge ones with the big – and they are the ones who tend to sit in and y'know the shops where they sell the vapes and they've got the big massive things where they have smoke coming out, so it's like people tend to go for like a shape and size

Barbara (ex-smoker): it's very stereotypical, isn't it? Like a trend thing

Poppy (smoker): yeah, I dunno if it's like conscious like, I want the lady type one. Mine were always pretty pink or pretty colours

Barbara (ex-smoker): I always get the plain ones because I don't see it as a fashion accessory at all

Poppy (dual): no, no, it's not that I saw it as a fashion accessory it was kind of like it was more like ladylike, I didn't want that big thing y'know the little one it was more ladylike, it's like having a posh cigarette

In the extract above, the use of the intensifying word 'very' by Barbara emphasises the negative implications, which is then repeated by Mary, illustrating preference for agreement by repeating the extreme adverb. Mary also goes on to use the extreme case formulation 'nobody', implying that if ECs were clearly marketed as quitting smoking devices then no-one would use them recreationally, because of the stigma attached to quitting smoking. The stigma discourse is then heightened as Poppy protects herself when she states 'no, no it's not that I saw it as a fashion device' following the previous comments from Barbara and Mary at the start of the extract. Using ECs as 'fashion accessories', part of a 'trend' or for any other purpose other than quitting smoking was frowned upon. By Poppy positioning herself in this way, she is using her own judgement and trying to position herself acceptably in regard to the peer norms in the group (Foucault, 1977).

These ideas expand on concepts from Bell and Keane's (2012) discussion around the ideological challenges surrounding the binary categorisation of 'good' and 'bad' nicotine. As previously discussed in Section 2.3.13, ECs were initially brought into the public health view as part of the procedure of tobacco control, moulded to fit this regimen and therefore branded as a cure or remedy to nicotine addiction ('good' nicotine). ECs were seen as clean and safe forms of nicotine when compared to the unsafe and deviant nicotine seen in a CTC. Recreational device use has blurred the boundaries between 'good' nicotine and

'bad' nicotine (Bell and Keane, 2012) and it appears that bigger devices are falsely associated with recreational use.

By engaging in 'good' and respectable EC use, participants distance themselves from anything that would not contribute to a social identity that is acceptable, positioning themselves as responsible and moral. This suggests that there is a constructed social understanding that EC use should be, firstly, utilised only for stopping smoking purposes, and secondly practised with care and sensitivity for others. Attacking the position of recreational use agenda altogether, places the speakers Barbara and Mary in a position of power. The disapproval of recreational EC use stems from concerns that ECs pose a risk to younger people and/or act as a gateway to CTC use.

In regard to e-liquid flavours, there was concern that particular flavours were 'targeted at the young ones' (Barbara, FG1). This was contradictory as participants had often stated how they were unsure what the risks were, if there were any. The concern for young children, discussed in both FGs, positioned the speakers as considerate of the health of others, even though their habits may damage their own health, this positions the speakers as moral. Participants accounts demonstrated how they managed their stake, in an attempt to prevent projecting themselves as immoral (Edwards and Potter, 1992) by identifying they are aware of the moral way to use an EC.

Concepts of group-serving bias (Taylor and Doria, 1981) can be recognised here, as people make trait attributions that benefit their in-group (just as they do with themselves); in this instance, the group co-construct the appropriate and moral way to use an EC. Participants often used honest phrases (Edwards and Fasulo, 2006) such as 'to be honest' and 'actually' to make themselves appear honest when engaging in this potentially controversial talk. In this sense participants attempt to appear more genuine and therefore moral in regard to their EC use.

[Lines 310-315]

Sophia (non-smoker/vaper): it's kind of like the old phones isn't it? Like the old mobiles where it was like this big

Daisy (dual): except they were so cool then [laughs]

Sophia (non-smoker/vaper): [laughs]

Valentina (dual): [laughs]

Sophia (non-smoker/vaper): but vapes were like that cool back then, for some people

Daisy (dual): for some people

In the above discourse, Daisy, Sophia and Valentina mock EC users who strive to be 'cool'. Social Identity approach (Tajfel and Turner, 2004) predicted that ingroup member reactions (laughter vs. non-laughter) to the same humour should have a stronger influence in shaping humour appraisals than the reactions of outgroup members. In the extract, laughing is a way of mocking the out-group (people who use bigger ECs recreationally) and confirms affinity toward the in-group. It has also been argued that out-group derogation is a natural consequence of the categorisation process (Tajfel and Turner, 2004). This is particularly interesting as at the beginning of the FG discussion, participants disclosed that they all had varying EC/smoking statuses.

Irrespective of the varying levels of acceptability within EC products themselves, when compared to CTCs they were still viewed as more 'socially acceptable'. There was general consistency within the accounts of the users that ECs had accentuated their nicotine addiction, which contradicts the previously discussed 'acceptable' way of using ECs (quitting smoking and eventually eradicating addiction) that have been co-constructed across both FGs.

[Lines 87-101]

Barbara (ex-smoker): well, I don't know because I don't go any prolonged period of time without having it – without vaping, at the end of this forum it's probably the longest time I've been without it, yeah, this is probably one of the longest times I've done because I vape permanently, it even puts me off going places, so, if you go to the cinema, before I go in it's like vape vape vape vape vape and then as soon as you go out the door it's like the first thing you do

Poppy (dual): I used to go to the toilet and vape, but I was so nervous about setting the smoke alarm off that I would be over the toilet vaping and trying to blow the smoke the toilet as I'm flushing the chain

Vic (ex-smoker): can they set them off though?

Poppy (dual): I don't know

Barbara (ex-smoker): nah

Poppy (dual): but I was just so nervous, nah I was exactly the same, my vape that was in my back pocket, so if I went to the toilet for a wee I would be smoking using that vape, even in this building I would do it [laughs] even though you are not supposed to, but yeah I was

Barbara (ex-smoker): it's cos it's more socially acceptable

In the above extract Barbara specifies the amount of time she can go without using the EC. She describes of the amount of time, i.e., the 'longest' time, which is the maximum possible. The 'longest' and 'permanently' are maximum case formulations, which propose an amount of time that is unacceptably long (Pomerantz, 1986). The longest period of time paired with her choice of the word 'permanently' suggests her EC use is infinite. The negative repetition of the word 'vape' (Barbara, FG1) places further emphasis on how extreme her EC use is. Poppy uses conceding language when she states she 'even' vapes in this building, where it is illegal to use ECs indoors, suggesting that nicotine addiction from ECs has resulted in her breaking laws to consume her EC. She laughs when she is discussing this, using humour to minimise the seriousness of her statement.

[Lines 196-207]

Daisy (dual): and I think the fact as well you can do it inside, you can do it all the time, so actually I think you end up more addicted to nicotine and actually I think that's a massive draw back

Valentina (dual): yeah

Daisy (dual): we were discussing how they should tell you what's the equivalent of a cig as well when you smoke it to tell you when you've sort of had your cigs worth, that would be so useful for now cos I use mine so much like I'd love to know how many cigs worth I smoked

Sophia (non-smoker/vaper): and you can do it all day every day, there's not really a restriction in that sense and you don't know how much you are smoking and it's probably like for people who have never smoked a cigarette before there's no way to regulate it

Daisy (dual): I think if there were some plan to help you eventually come off the vape and you have a structure that would help people eventually come off the e-cig and not become more addicted

Dominic (dual): yeah, 100%

In the extract, Daisy uses similar discursive strategies to emphasise the potential infinite use of ECs, suggesting you can use it 'all the time'. Sophia repeats 'all day', 'everyday', which is interesting as Sophia identified as a non-vaper/smoker. Conversational exchanges usually occur in pairs (Sacks, 1992), meaning negative points are usually continued by the successive speaker, which is understandable as group identity is often based on shared experiences (Tajfel and Turner, 2004). Sophia's response orients to the preference for agreement (Pomerantz, 1984) by corroborating with Daisy's account regardless of her lack of personal experience in what she is talking about.

It is evident that stigmatisation has a significant impact on decision-making around addictive behaviours (Matthews et al., 2017). This discourse suggests that these types of behaviours are often compared and contrasted dichotomously with one another, reflecting the previously discussed binary categorisation. However, this can be limiting and preventative in terms of smoking cessation. Categorising EC products as 'bad' or 'good' could potentially prevent certain people quitting (for example, if they preferred bigger devices but felt stigmatised using them so eventually went back to smoking). It is important that this discourse in society is reframed to promote THR.

6.4 Summary of Key Findings

EC accounts were co-constructed between participants with varied smoking/EC experiences during the group discussion on a moment-to-moment basis (Antaki, 2008). In the discourse of uncertainty and risk, there were discussions about the appropriateness and safety of ECs by reflecting on ambiguous health-based and social-based risks. This suggests that informative based agendas are more complex than health education alone, given continuous recommendations by health organisations in the UK to promote ECs as a less harmful alternative to CTCs (PHE, 2019) and the abundance of accessible resources that provide useful information (Cancer Research UK, 2020b; Nhs.uk, 2020). This demonstrates the complexities of ECs in society and emphasises the challenges faced in generating appropriate policies. Health communication campaigns focused on ECs could be reframed to have better effects, but must remain truthful and accessible, whilst avoiding using ambiguous terminology and language which, evidently, is confusing. In this instance, it may be beneficial to look at theories such as the unified theory of acceptance of use of

technology (UTAUTV; Venkatesh et al., 2003) and diffusion of innovation (Rodgers, 1983) for general guidance of how accurate information about technology can be effectively accepted and implemented in wider society.

In the social acceptability and stigma spectrum discourse, the false dichotomy of either the moral EC user trying to quit smoking, compared with recreational user, oversimplifies the complexities of EC use. The subject position of a 'moral user' is portrayed when a participant fears they may be subject to criticism or social disapproval. The discrimination aimed toward certain EC users and devices is problematic, as it may negatively impact individual decisions about effective THR products. The limitations of this type of exclusive thinking (smoker vs. non-smoker/vaper vs. non vaper/addict vs. non-addict/ moral vs. immoral user) are reflective of the previously discussed 'fixed' vs. 'growth' mindset (Sridharan et al., 2019). Previous research has demonstrated that a 'growth' mindset is more effective in smoking cessation when compared to a fixed (the behaviour is unchangeable) mindset (Sridharan et al., 2019).

6.5 Conclusion of Chapter 7

This chapter demonstrated that participants use two main discursive frameworks to communicate perceptions of EC: (1) Uncertainty and Risk and (2) Social Acceptability and the Stigma Spectrum. A summary of these frameworks can be found above in Section 6.4.

Strengths of this study were that the interactions were between participants, with minimal input from the researcher. The environment was socially orientated and the conversations between participants were reflective of natural speech, providing a unique insight in how EC accounts are discussed in social situations. This was of particular relevance as each FG had a diverse range of participants, meaning the groups were particularly reflective of 'real-life' situations (Roller and Lavrakas, 2015), whereby groups of people would genuinely be heterogenous in their EC/smoking status. Regardless of the limitations of online FGs that have been discussed in previous literature (Tates et al., 2009), both FGs appeared to have honest and open discussion about their experience, and more importantly there was balance of discussion with equal contribution from all participants.

There were surprising benefits of the use of the online FG in particular. The use of the videotelephony and online chat platform, Zoom, allowed participants to have equal space

on the screen, which may have inadvertently promoted balance and sense of equality between participants, which may have been particularly beneficial for a heterogeneous group. Due to the nature of Zoom, and the lack of available communication and bodily cues (Stewart and Williams, 2005), it was thought that spontaneous feedback and discussion may have been limited. However, participants were particularly attentive to others' talk and in some cases would go back to invite another to carry on speaking, if they were aware they did not get the chance to. This enhanced the balance further and also created a respectful atmosphere whereby participants were more likely to feel like they could be sincere. As well as this, participants were also in a space they were familiar with, such as their homes, this may also have allowed them to feel more relaxed which may have increased honesty and authenticity when compared to a university setting whereby the FG discussion was meant to take place.

This study further contributed to the body of knowledge generated from Study One and Study Two, as it highlighted the uncertainty and misunderstanding of ECs in society. The uncertainty appeared to be emphasised within social situations, as no participants would commit to making any bold or certain statements. It also accentuated the varying levels of stigma and social acceptability between devices that were highlighted in Study Two. Interestingly, uncertainty and the varying levels of stigma were heightened in the social situations.

Like all qualitative research, the findings cannot be generalised outside of this study. Socioeconomic status (SES) and gender were not explored in this study, which is limiting, as previous research has demonstrated it has been linked to differences in perceptions of ECs (Hartwell et al., 2017; Green et al., 2020). Additionally, recruitment difficulties as a result of Covid-19 meant that all six of the participant categories that were included in Study One and Study Two were not reflected; for example, there were no participants from Category four or five in this study. Future research could conduct 'street' interviews with adults in public space where EC use (and smoking) takes place (e.g., designated smoking/vaping areas). Examining patterns of discourse in the naturally occurring contexts in which they took place would provide insight into how discourses that are related to health behaviours, such as ECs are discussed whilst participants are engaged in the act. It could also be suggested that the discussions could be transcribed in a finer detail, such as the Jefferson transcription method (Jefferson, 1991) to allow for a more sensitive discourse

analysis (Potter and Hepburn, 2005). The following chapter will triangulate the findings from all three studies in the thesis to address the aim and conclude the thesis.

Chapter VII – Data Triangulation and Discussion

7.1 Introduction to Chapter

The aim of this chapter is to consolidate the findings from all three studies to address the original aim of the thesis, which is to understand the facilitators and barriers of EC use for adult smokers and non-smokers.

The aim of Study One (Chapter 4) was to generate initial accounts of ECs from adult smokers and non-smokers by exploring the factors that influence behaviour and opinion. The analysis identified that the key factors are related to social context, informative sources, practical aspects and health implications. This chapter generated an understanding from a large number of accounts (n=51) to provide a broad context for the following studies.

The aim of Study Two (Chapter 5) was to provide a more in-depth insight and build upon the findings from the first study, by using a SSI method to probe individual experience of EC use from 12 accounts to provide an understanding of the factors that encourage and deter EC use. The analysis identified the key factors that encourage or deter EC behaviour in adult smokers and non-smokers are related to social context, representation and knowledge, aspects of addiction and device related issues.

The aim of Study Three (Chapter 6) was to understand how people use language to communicate perceptions of ECs, by exploring the discourse from two FGs (FG1 n=4, FG2 n=6) to provide a method of enlightenment on how EC accounts are discussed in social situations. The analysis identified that participants draw on two main discourses to communicate and understand ECs; these are (1) uncertainty and risk and (2) social acceptability and the stigma spectrum.

This chapter begins by triangulating the data from all studies by comparing and contrasting the key findings from each. It then goes on to discuss the triangulated findings with reference to relevant literature and theory. The novel contribution to knowledge is highlighted followed by recommendations for public health professionals, policymakers and suggestions for future research. Finally, the chapter ends with the strengths and limitations of this thesis followed by researcher's reflections on the research process.

7.2 Triangulation

The decision to triangulate the methods in this thesis was to develop a more comprehensive answer to the research question, whilst increasing validity through the convergence of data from multiple sources (Carter et al., 2014). The methods and analyses were selected purposefully to complement one another and develop a more comprehensive answer to the research question. The data from the three studies has been triangulated, an iterative process, whereby initial ideas about the perceptions of ECs (generated by the questionnaires) guide the exploration of successive individual accounts (SSIs) which are further enriched by the conceptualisation (FGs). Each individual study used methods that contributed to answering the research question in a unique way. By combining methods in this way, a full and more accurate answer to the research question is possible, as it is being studied from more than one standpoint (further justification for triangulation has been discussed in Section 3.9.5).

Chapter 4 demonstrated how the social context, which embodies all aspects of the social realm that surrounds individuals, moulds EC experience and subsequently behaviour and opinion. There was clear evidence of uncertainty about ECs, this was shaped by ambiguous and conflicting stories in the media, as well as a general distrust of EC manufacturers. Physical elements of the devices, as well as the health implications of their use, were also important in shaping behaviour and opinion.

Chapter 5 aimed to further explore these perceptions by using SSIs to explore individual accounts and ask questions based on the thematic outcomes from Study One. The findings similarly highlighted the importance and influence of social factors and interactions in shaping norms, attitudes and behavioural decisions. ECs were generally perceived as more acceptable than CTCs. Both studies captured the value of family and peer approval on EC decision-making. A particularly novel finding from this study was related to the varying levels of acceptability between EC devices, regardless of CTCs. The impact of conflicting EC information from mass media led to general uncertainty and confusion was also highlighted, mirroring Study One. Similarly, the physical functionality of ECs combined with the potential health implications they impose translated in to an encouraging or deterring factor. Unlike Study One, Study Two identified how aspects of addiction were a particularly influential factor in behaviour decisions surrounding ECs.

Study Three (Chapter 6) suggested that participants draw upon two main discursive frameworks when communicating perceptions of ECs. The first framework, uncertainty and risk, complements the findings from the previous two studies and demonstrates that informational uncertainty is a substantial deterring factor of ECs. Participants were transparent about their hesitation of the health-based and social-based risks of ECs, this was further supported by the discursive devices they used which linguistically reflected this stance. These findings are entirely complementary of the findings from the previous chapters. The social acceptability and stigma framework highlighted that types of ECs and associated reasons for use exist on a spectrum from most acceptable to least acceptable. Viewing EC related behaviours as exclusive is potentially limiting as labelling EC users as ‘moral’ or ‘immoral’ depending on how/where/why they are using their device may prevent smokers from using them. This echoes concepts from the findings of Study Two regarding varying levels of acceptability between EC devices.

The key findings identified from Chapter 4, 5 and 6 can be classified in to three categories of encouraging and deterring factors of EC use: social, informational and practical. Table 24 displays the facilitators and barriers of ECs from the outcomes of this thesis, grouped in to these three categories. The influence of the complex social, informational and practical dimensions on attitude toward ECs, and the creative ways in which they interact, questions the reductionism of some dominant health models. Particularly, the HBM (Rosenstock et al., 1974), the TTM (Prochaska and DiClemente, 1984) and the TPB (Ajzen, 1991) which have been criticised for ignoring the social elements that influence behavioural decisions (Abbantangelo et al., 2007).

Table 24

Facilitators and Barriers of EC use

Facilitators EC use	Barriers EC use
Social <ul style="list-style-type: none"> • More acceptable than CTCs • Encouragement from family or peers • Less strict regulations when compared to CTCs Informational <ul style="list-style-type: none"> • Understanding of how to use device and the belief it is safer than CTCs • Promotion and marketed as a cessation device 	Social <ul style="list-style-type: none"> • Discouragement from family or peers • Social facilitation (not able to mirror the social elements of smoking) • Perceptions of feeling stigmatised Informational <ul style="list-style-type: none"> • Uncertainty regarding the risks and safety and how to use the device • Concerns regarding intentions of suppliers

<ul style="list-style-type: none"> • Trusted sources that provide evidence-based information that ECs are safer than CTCs <p>Practical</p> <ul style="list-style-type: none"> • Aid to quitting • Accurately mirrors CTC experience when compared to other NRTs aid to quitting • Noticed positive health changes • Cheaper than CTCs 	<ul style="list-style-type: none"> • Apprehension about long-term consequences and that they will mirror CTCs • Requires specialised knowledge <p>Practical</p> <ul style="list-style-type: none"> • Not satisfying • Complex and difficult to use • Inconvenience (i.e., buying parts, charging device, etc.) • Inducing/Increasing nicotine dependence • inaccurately mimics cigarette experience (different experience) • Parts can break regularly which makes cost effectiveness argument unfeasible
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Figure 11 (below) provides a visual demonstration of the triangulation of the key findings from the three studies. Starting with the outcomes from individual studies and how these can be grouped in to either social, informational or practical factors. Finally, in the second half of the diagram, the findings from this thesis have been applied to the COM-B model of behaviour change. The COM-B model of behaviour change was chosen over other models that have been discussed throughout this thesis due to the emphasis on social (Opportunity) factors of behavioural decisions, which, all three studies in this thesis have highlighted is a key encouraging and deterring factor of EC use.

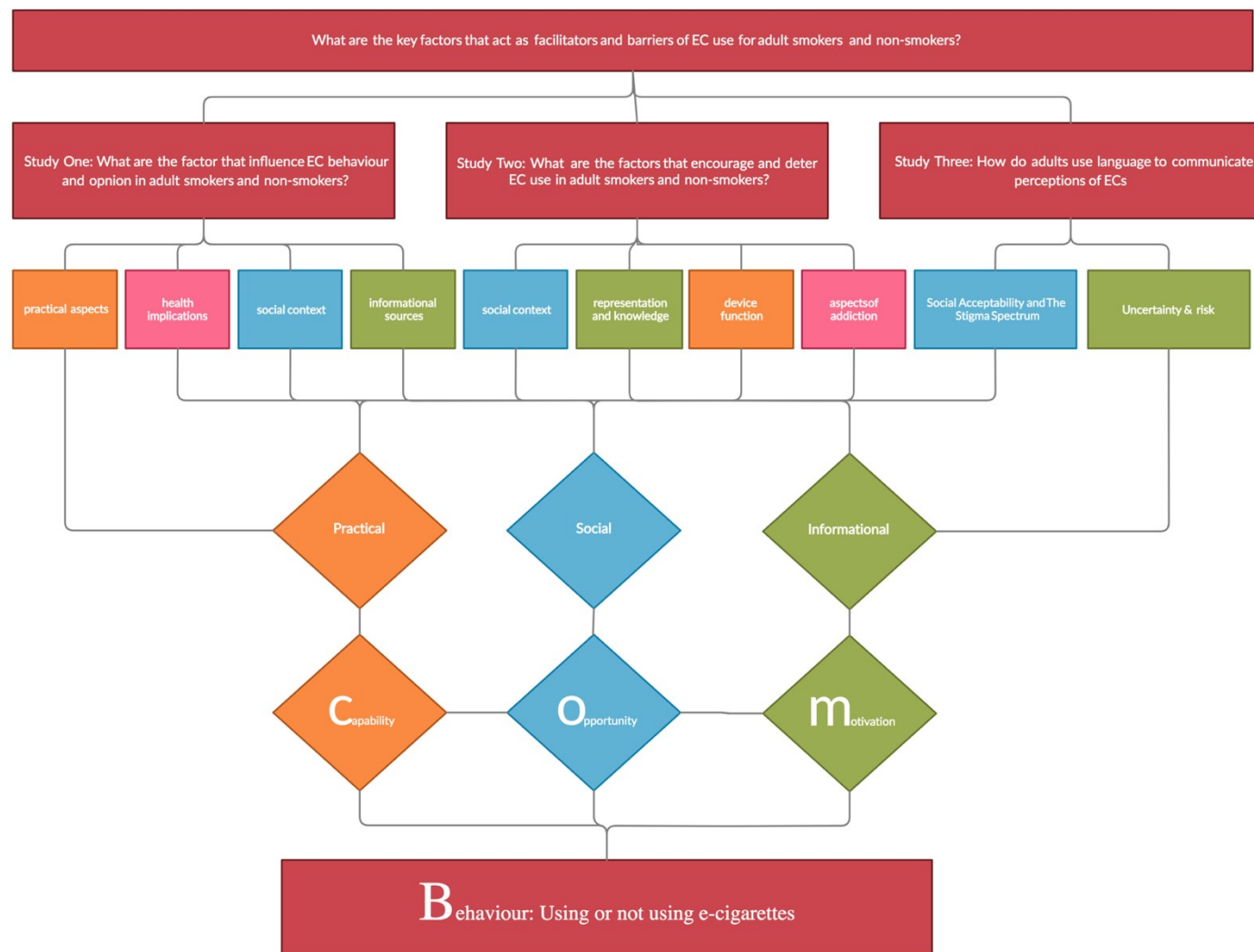


Figure 11 – Visual demonstration of the Outcome of this Thesis Applied to the COM-B Model of Behaviour Change

7.3 Discussion of Key Findings

The following section will discuss Figure 11, which illustrates how the key findings from this thesis can be applied to the COM-B model of behaviour change. This discussion will be referenced with relevant theoretical and psychological literature.

(C) Capability (practical factors): Enjoyment of ECs, the physical ability to use ECs and the practical knowledge of how to use the devices

The findings from all three studies highlighted the relevance of the practicalities of EC use, from functional aspects of the device itself to the physical accessibility to retailers selling ECs and related products. Practical factors that were encouraging use were related to perceptions that they are a useful aid to quitting smoking, accurately mimicking the CTC experience, noticeable positive health changes from use and cheaper than CTCs. Practical factors that deterred EC use were related to general dissatisfaction, inconvenient elements of use, increasing or inducing a nicotine dependency and inaccurately mimicking the CTC experience. The practical encouraging and deterring factors can be applied to the capability (C) element of the COM-B model, which refers to the skills and abilities required to engage in a behaviour, as well as the psychological enjoyment of the behaviour (Michie et al., 2011).

Evaluations of the practicalities of ECs were often made by comparing them to CTCs, which is logical as they were commonly used as a cessation device and there are similarities between the embodied hand-to-mouth movements used in both EC and CTC use (Cox and Jakes, 2017). Most smokers used ECs as a means of quitting smoking or reducing CTC consumption. Therefore, developing an understanding of ECs was often determined by their status and efficacy as a smoking cessation device. Although the physical embodied movements were in some ways similar, this did not necessarily mean they could accurately mirror the experience or perceived satisfaction. Some EC users would stop use because the product did not help them stop smoking or because of general lack of enjoyment. Alternative negative experiences (e.g., bad taste, not satisfying) were also deterring, this has been found in alternative research (Pepper et al., 2014; McKeganey et al., 2017; Notley et al., 2018). This is where the pleasure discourse surrounding health-related behavioural decisions needs to be considered (Duff, 2008, Moore, 2008; Farrimond, 2016). Especially

when considering that the emerging demographic discussed socialisation, recreation and pleasure as reasons for initiation and continued use. It is also important to consider evidence-based guidance on how ex-smokers who have used ECs to quit, can eventually discontinue EC use as participants across studies were concerned about this.

It is also important to find a balance between cost efficiency without compensating for device product quality. EC technology is constantly evolving with a wide variety of different devices and a proliferation of flavours. However, parts break regularly which make the cost effective argument unfeasible, this leaves users frustrated and can sometimes lead to relapse. The most cost-effective method for cessation is important for public health gain as smoking rates are higher among lower SES groups (ASH, 2020). It is the customisable and personal aspects of EC that has made them more popular than alternatives, this has also been noted by others (Simmons et al., 2016). This enjoyment can develop into a pleasurable hobby, rather than just a method of quitting smoking, which facilitates cessation attempts. This element was also important for the emerging demographic.

Locational accessibility to retailers that sell ECs and related products was influential in terms of use. This highlights an important risk factor in preventing smoking relapse. Previous research suggests that physical and locational availability of EC retailers increase exposure to environmental cues which promote EC use, but for others can deter quit attempts (Berg, 2018). Whether ECs exacerbate or eradicate nicotine dependency was varied across accounts, although it was an important element of decision-making around ECs for most participants, even for non-smokers/vapers. Nicotine experiences varied across the sample, which is understandable when considering the research aimed to have a diverse sample of participants that have a range of EC/smoking experiences. ECs challenge contemporary social meanings of nicotine addiction, establishing a new entity, leading to a cultural redefinition. ECs can function as a bridge linking different forms of nicotine, blurring the boundary between the categorisation of 'good' (medicinal) and 'bad' (recreational) nicotine (Bowker and Star, 2009). By restructuring these boundaries and removing the limitations of dichotomous categorising, ECs can function as a facilitative and transformative boundary objects (Tamini, 2017), as a result of their ability to reconcile differences in opinion in regard to the key actors in the field of THR.

When considering practical factors that encourage or deter EC, in terms of the capability (C) element of the COM-B model of behaviour change, EC use is likely to occur if: the device is easy to use, the additional practical elements that are necessary for device use such as charging and changing liquids are convenient and access to retailers selling device parts is not inconvenient. A psychological understanding that the devices are less harmful than CTCs and their ability to accurately mimic the CTC experience as well as perceived satisfaction will also encourage use.

(O) Opportunity (Social): Perceived Social acceptability from family and peers, and the areas where use is permitted (law/legislation)

The findings from all three studies highlighted the impact of the social context of EC use. This can be applied to the opportunity (O) element of the COM-B model which refers to the social and external factors that allow for the execution of a behaviour (Michie et al., 2011). Social factors that were encouraging in regard to EC use were related to; successful social facilitation, encouragement from family and peers, and increased social acceptability. Social factors that deterred use were related to; unsuccessful social facilitation, discouragement from family and peers and feelings of stigmatisation. The practical encouraging and deterring factors can be applied to the opportunity (O) element of the COM-B model which refers to social and physical opportunities to carry out a behaviour (Michie et al., 2011).

ECs were perceived as more socially acceptable when compared to CTCs and in some cases could provide a way of escaping the social stigma of being a smoker. However, the recent shift in social acceptability and meaning of smoking (Farrimond, 2006; Bell et al., 2010; Graham, 2012) appears to have caused some reluctance to accept ECs as an effective THR strategy, due to an anticipation of a social shift of EC acceptability in the future. As the ambiguity of ECs has persisted, new forms of stigma have also developed, particularly, the varying levels of acceptability between EC devices. Smaller devices that produced less SHV appear to be less stigmatised than bigger devices that produced larger amounts of SHV. This could be a potential explanation for the popularity of prevalent EC brands such as Vype, Blu, Logic and Juul (ASH, 2020). Combined with this, there is a constructed social understanding that EC use should be, firstly, only utilised for stopping smoking purposes, and secondly practised with care and sensitivity for others. EC use for reasons other than these were frowned upon and were scorned during the group

discussions. This could be understood by considering the in-group/out-group mentality discussed in the social identity theory (Tajfel and Turner, 2004).

Transitioning to ECs from CTC can create a new realm containing new categories of health-related identities by redefining the old ones. Yet, identity negotiation on a political and personal level is complex, as EC identity is also not exclusive or binary, particularly for dual users and recreational users. If EC use is aligned with positive identity elements it is likely to encourage use, although this was complex due to the varying levels of stigma between products. The stigmatisation of certain devices leading to discrimination aimed toward certain EC users is problematic and a major disservice to effective THR. One way of possibly reducing this could be to reframe the 'exclusive category' narrative that appears to exist (smoker vs. non-smoker / vaper vs. non-vaper/ successful quit attempt vs. failed quit attempt) which contribute to develop a dichotomous mindset (good vs. bad).

Social approval and perception of increased social standing was important in decision making, this was affected by contexts where smoking was forbidden by policy and law. EC use among family and peers appears associated with susceptibility to use EC in a way that is similar to the patterns found for CTCs. The impact of peer and family influence on smoking-related behaviours and EC behaviours has been demonstrated previously (Westmaas et al., 2010; Shruthi et al., 2017; Amin et al., 2019). The importance of social support in yielding better outcomes for tobacco cessation has been reflected on previously (Prochaska and DiClemente, 1984; Burns et al., 2014; Soulakova et al., 2018).

Contradictory to what EC advertising and marketing strive for, most participants across this research, users and non-users alike, felt that social status, particularly coolness, strived for by particular users was viewed as only feigning an ingenuine attempt at being cool. By using devices in an attempt to be cool would paradoxically be uncool, this may be a reflection of the age of the sample, as social attempts at being cool is often associated with youth use (Hughes et al., 2014; Hilton et al., 2016; ASH, 2019a).

Social meanings can become attached to ECs through a wide variety of overlapping cultural, political and technical practices. This shifts the focus from individual accountability of behaviour, to understanding the multidimensional interaction between wider societal structures and ideologies that underpin health behaviours. These interactions can vary

drastically throughout life, they are reflective of the interaction between structure and agency necessitating individuals in context (Short and Mollborn, 2015). Developments in understanding EC behaviours will successfully consider this complexity. In some ways the significant importance of social context as a facilitator and/or barrier is paradoxical, as others have discussed how ECs are reusable and private property (Keane et al., 2017) in opposition to CTCs which are interchangeable items that are often shared and exchanged (Dwyer, 2011).

To summarise, when considering social factors that encourage or deter EC, in terms of the opportunity (O) element of the COM-B model of behaviour change, EC use is likely to occur if; it is encouraged by family and peers, the EC device is socially acceptable and used for the co-constructed 'acceptable' reasons, and it can accurately mirror the social aspects of CTCs.

(M) Motivation (informational factors): Intentions, thoughts, feelings and impulses combined with conscious decision-making which are shaped by the complex public sphere of information

The findings from all three studies highlighted the impact of informational sources on EC use. Informational factors that encouraged EC use were facilitated by an understanding of how to use the device, beliefs they are safer than CTCs, which were shaped by trusted social, political and media discourse that provide evidence-based information that they are safe to use. Deterring factors were related to lack of specialised knowledge on how to use the device successfully, uncertainty regarding the risks and safety of the devices, concerns about the intentions of those providing information on their safety and apprehensions about long-term consequences. The informational encouraging and deterring factors can be applied the motivation (M) element of the COM-B model which refers to the want or need to carry out the behaviour over other behaviours (Michie et al., 2011).

ECs have created a quandary (Cahn and Siegel, 2011; The Lancet, 2013; Bialous and Sarma, 2014; Bullen et al., 2014; Pepper et al., 2016), with the big questions focused on whether they are hazards to health or the best chance to get smokers to quit. This is exacerbated in the echo chamber of social media, local news sites, and policy debates, which was reflected in the positions of participants across all three studies. There is

uncertainty, misunderstanding and ambivalence surrounding ECs. There was ambiguity surrounding the physical, social and health risks, as well as the efficacy of the devices themselves. Users and non-users alike feel there is limited available knowledge and the knowledge that is available is contradictory, which impacts decision making around EC use. In some ways the element of uncertainty was perceived as more threatening than actual fatal risks such as cancer or COPD. This may be because uncertainty means that risk calculation cannot take place (Rosenstock, 1974).

Feelings of uncertainty in regard to ECs are echoed in previous research (Pepper and Brewer, 2013; Beard et al., 2014; Sherratt et al., 2015; Rooke et al., 2015; Tamini, 2018). These expressions of uncertainty reflect the circulated controversy across a variety of media platforms. EC information is communicated through a wide range of platforms, which highlights the media's role in creating 'technological stigmas' (Garrick, 1998) that impact decision-making surrounding ECs. This is understandable as the diffusion of innovations theory (Rodgers, 1983), emphasises the importance of the media in shaping perceptions of technological innovations (Rooke and Amos, 2013). Misunderstanding often creates fear, which goes on to largely stigmatise health-related behaviours and associated technologies (Stuber et al., 2008). To avoid the amplification of risk and associated stigma, health-related messages should address this uncertainty, highlighting key differences between harmfulness of tobacco and nicotine. Informing the public on understanding the difference between marketing claims and evidence-based claims would also be beneficial.

This complex and continuously evolving technology requires a specialised understanding for competent use (McKegnaey and Dickinson, 2017). Due to the unclear information presented in the media, shared knowledge between users develops an understanding of ECs, which has been demonstrated in alternative research (Emery et al., 2014; McKeganey et al., 2017; Notley et al., 2018;). Study Three also demonstrated that participants often used discourse makers to invite others to speak on topics they feel uncertain about. Many look to other sellers and users as their experts and source of knowledge, generating a network of shared knowledge by developing shared understandings on the ambiguous topic. Previous research has discussed how the delivery of information and advice from other ECs users is particularly useful (Emery et al., 2014). From a Public Health perspective, those contemplating vaping for cessation need encouragement, training and support to become competent, this is important in terms of THR. Peer support networks that

could be incorporated into cessation interventions using ECs, whereby experienced users share knowledge with non-experienced users. In the UK, the peer involvement approach has been successfully implemented into some stop smoking services (SSS) by listening and working with vapers (Notley et al., 2019).

To summarise, when considering the informational factors that encourage or deter EC use, in terms of the motivation (M) element of the COM-B model of behaviour change, EC use is likely to occur if; users feel they understand how to use the device successfully, they are confident in their knowledge that they are less harmful than CTCs and information is easily accessible, decipherable and perceived as trustworthy.

7.4 Contribution to Knowledge

This thesis presents findings that are concurrent with existing literature, but there are also a number of novel contributions. The findings from this thesis concluded that social, informative and practical factors act as facilitators and barriers of EC use. Social factors relate to the utilisation and understanding of the social representations of ECs. Informative factors capture the impact of conflicting EC related communication in shaping understanding. Practical factors frame how device functionality and health implications are experienced. Many of the findings complemented alternative work, but some were novel, highlighting a unique contribution to knowledge. The first novel finding and significant contribution to knowledge from this thesis is it demonstrates the varying levels of social acceptability between EC devices regardless of CTCs. Encouraging a flexible growth mindset may be useful in reducing such stigma and subsequently may be beneficial in terms of THR. A flexible mindset can potentially reduce exclusive thinking about EC/smoking identity categories which is beneficial when considering most people smoke on the journey to permanent quitting. Findings also highlight the importance of shared peer-to-peer knowledge between EC users in facilitating quit attempts and overcoming functionality difficulties. It is also important to consider the 'next steps' for ex-smokers who wish to discontinue using their EC.

7.5 Recommendations

The following section will directly outline the recommendations relevant to public health professions, policymakers as well as recommendations for future research and the alternative considerations generated from this thesis.

7.5.1 Public Health Professionals

The findings from this thesis demonstrate that ex-smokers would benefit from evidence-based guidance is on how to discontinue using ECs after successfully quitting smoking. It is also important to acknowledge and reflect on the pleasure discourse when considering addiction, ECs and THR. Public Health professionals should also consider the importance of encouragement, training and general educational guidance in developing EC competency, which could subsequently increase successful quit attempts, this is particularly advantageous when it comes from fellow users. Peer support networks could be implemented into cessation interventions using ECs, whereby experienced users share knowledge with non-experienced users. The sharing of knowledge from other users would also be beneficial as alternative research has demonstrated that although fact sharing is presented as neutral and simple from stop smoker advisors, it can actually be perceived as condescending and shaming (Matthews et al., 2020). Therefore, information delivered from other users may reduce perceived stigma and consequently be more effective.

Encouragement of a 'growth' mindset within those who are looking to quit smoking would be beneficial. A flexible 'growth' mindset could potentially facilitate the reduction of stigma between EC products. Categorising EC products as 'bad' or 'good' could potentially prevent certain people quitting (for example if they preferred bigger devices but felt stigmatised using them and eventually went back to smoking). One way of doing this could be to reframe the 'exclusive category' narrative that appears to exist (smoker vs. non-smoker / vaper vs. non-vaper / successful quit attempt vs. failed quit attempt) which contribute to the development a dichotomous mindset (good vs. bad). Thinking in terms of exclusive and dichotomous categories could prevent people from trying to quit, causing them to completely give up. This form of thinking may prevent individuals from understanding the benefits of THR. Growth mindsets in interventions can restructure beliefs about addiction and can be beneficial for reducing addictive behaviours (Shridharan et al., 2019).

The findings from this thesis demonstrate the complexities of EC existence in society, and emphasises the challenges faced in generating an appropriate policy approach towards ECs. Health communication campaigns focused on ECs could be reframed to have better effects but must remain truthful and accessible whilst avoiding using ambiguous terminology and language which evidently is confusing.

7.5.2 Policymakers

The diversity of users' needs to be considered when making decisions around ECs. The data from this thesis suggests that future THR related strategies should consider policies that allow EC paraphernalia to be more readily available than CTC, as it is a cause of relapse. There needs to be transparency between communication systems to ensure that accurate informative knowledge is absorbed. Contradictions about ECs do a major disservice to evidence-based public health and the findings from this thesis demonstrate that evidently the general public are confused. A useful way of addressing this would be to consider techniques that address and improve media literacy, particularly EC related media. This education should help the general public understand and differentiate between evidence-based information and marketing. It is important accurate information to be communicated efficiently to avoid stigmatising ECs, which could prevent smokers from wanting to use them, whilst also ensuring non-smokers are deterred from using them.

7.5.3 Emerging Demographic

The important elements of EC initiation and continuation for the emerging demographic were related to socialisation, recreation and pleasure. This form enjoyment can develop into a pleasurable hobby which could potentially create a nicotine dependency. Therefore, when considering the implications of this, future research should establish effective ways of preventing uptake for this demographic.

7.5.4 Future Research

Future research should continue to explore the social context and practices that surround ECs. Understanding how ECs interrupt and become integrated into identity cycles and how this impacts addiction would be useful to improve smoking cessation services. The varying levels of social acceptability within and between EC products could be examined further to provide a unique insight into the typology of ECs irrespective of CTCs.

Findings from this thesis have demonstrated that informative agendas are more complex than health education alone. Future research could be conducted to understand the most effective ways of delivering this information combined with investigations on how to improve general media literacy within the general public.

Finally, future research should continue to explore how Covid-19 and EVALI have impacted perceptions of ECs. As well as following how any new changes to regulation as result of Britain leaving the EU will impact users.

7.5.5 Alternative Considerations

Findings from this thesis also have broader implications for research objectives outlined by the Electronic Cigarettes Priority Setting Partnership (ECPSP). The ECPSP was established in 2018 by the UK Centre for Tobacco and Alcohol Studies (UKCTAS) at the University of Nottingham to identify unanswered questions around the use of ECs as a tool for smoking cessation and harm reduction (Hunter et al., 2020). Question five was related to the facilitators and barriers of ECs for tobacco cessation. This thesis contributes towards answering this, the facilitators and barriers of EC use for adults with varied smoking/EC experiences can be found above in Section 7.2, Table 24.

7.6 Strengths and Limitations

The strengths and limitations of the individual studies in this thesis have been discussed in Chapter 4, 5 and 6. This section discusses the strengths and limitations of the thesis as a whole. Before this thesis, no study has used a multi qualitative methodology programme to explore smoker and non-smoker perceptions of ECs in the UK, in the aim of understanding the facilitators and barriers to EC use. This research also focused on some non-smoker perceptions which is novel. Understanding non-smoker perceptions is important as non-smoker attitude may influence user decisions surrounding ECs, as peer approval and judgement is important, which is supported by the findings from this thesis.

The comprehensive multi-method methodology, data collection and analyses were selected to be complimentary therefore maximising the benefits of each approach. The approach was iterative, with each step informing and shaping the next. The findings from Chapter 4 were used to inform and develop the interview schedule used in Chapter 5. The findings from Chapter 5 were used to develop the discussion guides for Chapter 6. The online OeQ (Chapter 4) allowed a level of disclosure that the other studies could not, due to the anonymity that it provided. The flexible structure of SSIs (Chapter 5) allowed expansion and confirmation which could not have been achieved in the OeQ (Chapter 6). The FG altered the shift between researcher and participant to allow the discussion to be as participant led as possible due to the participant-to-participant interaction. Participants were detailed in

their responses and shared a large amount of information in all three studies. By using more than one study in this thesis, it became clear which element of ECs were the most dominant by noticing which aspects appeared across all three studies.

A strength of the thesis can also be found in the methods put in place to ensure the rigour and credibility of the research. All studies were conducted following methodological recommendations from Nowell et al. (2018) regarding methodological rigour in qualitative research. As previously discussed, Study One was written up for publication and published in *The Journal of Health Psychology* (Wilson et al., 2020). Study Two has recently been accepted for publication in *Psychology & Health* (Wilson et al., 2021). Study Three will be written up for publication following the submission of this thesis.

To enhance the credibility of the thesis, the researcher provided rich contextual information about each study (Chapter 4, 5, 6) and a detailed description of every step of the research process (Sections 4.4.2, 5.2.3 and 6.2.3). This enabled the analysis to not only present a detailed and rich description of the participants' experience but also the context in which it occurs (Morrow, 2005). It is important to consider the extent of transferability of these findings. The transferability of the findings may not extend to understanding the experiences outside of this sample. As discussed in the literature review (Chapter 2), there is a lack of a consistent global regulation of ECs, limiting transferability of findings on a global scale. Therefore, in different contexts, whilst the global needs may be similar (in terms of THR), the individual and contextual ways that these manifest are likely to differ. This is important to understand so that health guidance and policy decisions are culturally relevant to the individuals in question.

A key strength of this PhD is the size of participant group, the total sample of this PhD included 73 participants – a large sample for a qualitative PhD project. The study also benefits from exploring accounts from individuals with a wide age range (18-65). The current PhD makes an important contribution to the existing knowledge in this area more specifically factors that act as facilitators and barriers of ECs for adult smokers and non-smokers. Explicit contribution to knowledge has been discussed throughout Chapter 7.

Although the research in this thesis was an advanced attempt to explore EC accounts from adult smokers and non-smokers, the project was associated with a number of limitations which need to be considered and discussed. It is particularly limiting that this PhD aimed to

understand the perceptions of the emerging demographic, yet the third study had difficulty accessing this group and therefore there were no participants that fit this demographic within Study Three.

Sampling bias may have occurred through the selection of participants due to the limitations of opportunity sampling, as it is not random (Emerson, 2015). However, this form of recruitment has been justified in Section 3.3.1.2. The samples across Studies One, Two and Three appeared to be largely white, limiting the transferability of these results to different ethnic backgrounds, however the purpose of this study was not to generalise findings. All three studies in this thesis did not examine the effect of SES and gender on EC accounts, which, as previously discussed is limiting because previous research has demonstrated it has been linked to differences in perceptions of ECs (Hartwell et al., 2017; Green et al., 2020). A more sophisticated method of recruitment would benefit the research by potentially including measurements of family size, social class and standard of living (Diemer et al., 2013).

The self-categorisation aspect of the research was conceptually challenging. Participants would self-identify with a particular category and then during the interview or FG discussion, disclose information that would contradict their self-categorisation, this may be a result of social expectations. Webber (2018) suggests that rather than seeking to achieve 'correct' classification, applying at least two categorisations may be more practical. One reflection a person's own self-identification and one on how they are socially perceived.

7.7 Conclusion

The overall aim of this research was to gain insights into the factors that act as facilitators and barriers for adult smokers and non-smokers concerning ECs. To achieve this aim, the current research employed a range of research strategies, including the use of OeQs, SSI and FGs. The individual studies combined different qualitative approaches, and included an online OeQ, SSI's and FGs, with thematic analyses and discourse analysis informed by discursive perspectives. This thesis has been theory and practice-driven, psychological theory was considered when interpreting the results and practical findings. Implications have been drawn from the conclusions of all three studies. It is concluded that this thesis makes an authentic and significant contribution and is of significant practical relevance to

public health professionals, policymakers and other academics who are interested in this topic.

7.8 Reflections on the Research Process

My position as a researcher has been discussed in Section 1.5. As previously discussed, it is widely understood that the inherent biases and beliefs of the researcher influences all stages of data collection. It is therefore vital for researchers to clearly state these beliefs and discuss how they may impact the research (Austin and Sutton, 2014). I maintained a curious perspective as suggested by Le Vasseur (2003), by questioning my analysis in light of my life experiences and presuppositions. Assuming this perspective meant I could gain a greater understanding of the participant experience by going beyond ordinary sense making. I also adopted a bracketing technique (Tufford and Newman, 2010) which allowed me to reach deeper levels of reflection across all stages of the research, the sustained in-depth reflection potentially facilitated a more multi-faceted analysis and subsequent results.

When reflecting on my work I often used Gibbs (1988) model of reflection. A number of reflections were made throughout the process of completing this thesis. These were recorded in a reflective journal to try to minimise the risk of bias influencing the findings of the study. As previously highlighted in Section 1.5, although my approach to thinking and research is integrative, my epistemological position is aligned more with interpretivism than positivism. I believe personal epistemological positions to be generally fluid and can change throughout ones research career. For example, when I finished my BSc, I would have considered my epistemological position to be more in line with positivist ideologies. As part of my MSc, I decided to implement a mixed-method sequential explanatory design to expand my portfolio of methods as a researcher. During this process my epistemological position as a researcher shifted, as I started analysed data using interpretive phenomenological analysis to enter into participants' lifeworld. Therefore, when commencing this PhD, I had warmed to the potential of qualitative methods and their ability to connect with true human essence when compared with quantitative methods. However, at another point in my academic career this could shift again.

I am aware the participant accounts presented in this thesis may not be completely transparent. I am in no way presuming that my interaction with participants gave me full access to their experiences and I am also not claiming that I fully captured their accounts

(Mauthner and Doucet, 2003). However, when analysing the data, I was aware that the participants were reflexively positioned between the researcher and researched and therefore it is probable that I gained some insight into their subjective experience (Mauthner and Doucet, 2003). As far as I am aware, the participants SSIs and FGs seemed happy to share their accounts with me. For example, it was common in the SSIs for participants to show me their EC and how it worked.

I reflected upon the fact that as a researcher I was conducting the SSIs and FGs. As a result, this may have created a perception to participants that I was either an advocate or critic of the use of ECs, due to the in-group/out-group mentality that is often hyperbolically portrayed in the media surrounding ECs. As such, this may have influenced the way in which participants perceived certain questions. In practice, to minimise this risk of bias, before commencing, it was explained to the participants my position as a neutral researcher and the purpose of the research was to understand their experience. During these interactions, due to the uncertainty and ambiguity about ECs, it was common for participants to try and ask me questions about areas they did not understand, indicating that they viewed me as the expert. It was important for me to refrain from answering these questions, so I did not influence participant views, whilst also maintaining that I made sure that the interviews and discussions were not just about collecting information from participants. Although, it is important to point out, I did signpost participants to resources where they could find useful information on the issues they were questioning me about following the completion of the interview and/or FG discussion.

One aspect of my thesis I would change if I were to start over, is the use of standardised well-validated measures to categorise participants, such as the Penn State nicotine Dependence Index (Foulds et al., 2014). This measure has scoring guides for both ECs and CTCs, this could prevent any overlap or confusion about which category participants belonged to. I would also implement homogenous FGs, to provide a more in-depth understanding of the nuance between how users communicate and whether it would differ if all participants had similar smoking/EC statuses. As discussed in Section 6.6.2, this was part of the initial plan for the project, but due to external factors, it did not go ahead. Therefore, this something I am considering undertaking in future research projects once I have completed this PhD.

The field of EC research is fast paced and continuously changing. I started data collection for my first study in October 2019 and conducted the last FG in May 2020. During this time there were numerous developments in the field. For example, I was aware of the growth of the EC market in general, the growing popularity of the new fourth generation EC, the fluctuating stances of organisations and countries have on EC use, the ongoing debate about ECs in the media, the outbreak of EVALI, the potential changes to policy as a result of Britain leaving the EU, the recent ban on menthol CTCs in the UK and the outbreak of Covid-19. As a result of the changing context, it is important to understand and disclaim that the perceptions of the participants may have changed. I feel these contextual changes that formed the backdrop to this research provided me with a unique opportunity to explore experiences in a changing environment. I have found researching a topic such as ECs, which is in some ways could be described as controversial, particularly compelling.

I was particularly determined to recruit outside the student population. This demographic was the most easily accessible, but I did not want my research to be solely focused on this demographic. This made recruitment particularly challenging, due to the limited time and financial resources I had as a PhD student researcher. Navigating this meant that often the line between my work and leisure time was often blurred and I found it difficult to 'switch off'. Although, I imagine this is common for many PhD students, due to the commitment and challenges pursuing a PhD brings. Socialising (before Covid-19) was sometimes occupied with pursuing potential lines of enquiry. People were often curious about what I did, and due to the current buzzworthy nature of ECs they were keen to ask me questions and discuss their opinions. Most people I encountered who I discussed the project with were interested in it, which increased my own confidence and enthusiasm for it.

The uncharted waters of research during a global pandemic was absolutely challenging. As a result of the pandemic, I had to conduct the final FG remotely using Zoom. Although this was technically a small aspect when compared to the size of the thesis, and the final element of data collection, I still had to make rapid ethical and practical amendments. Recruitment was difficult as understandably potential participants were likely to be concerned about other things to commit to taking part in an online FG. It has been important to conduct research and learn in these circumstances, as a result of the ongoing pandemic these skills will be useful in any research future avenues I take. I hope that I am now more considerate all individuals who use ECs regardless of their intention.

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Appendices

Appendix 1 – An example of recruitment media



Research Participants Needed

Are you:

- Over the age of 18?
- A smoker or non-smoker?
- Willing to share your thoughts on E-cigarettes?

If you fit the above criteria, we invite you to take part in an interview that will take up to 60 minutes

If you are interested in taking part or would like more details please contact: georgia.wilson@stu.mmu.ac.uk



This research has been ethically approved by Manchester Metropolitan University

Participant Information Sheet
A Qualitative Investigation into Smokers' and Non-Smokers' Accounts of E-
cigarettes

1. Invitation to research

My name is Georgia Louise Wilson and I am a PhD Psychology student at Manchester Metropolitan University. I am conducting research exploring smokers' and non-smokers' accounts of E-cigarette use and would like to invite you to take part

2. Why have I been invited?

You have been approached because you are over the 18 and you are either a smoker, non-smoker, dual user or never user of E-cigarettes.

3. Do I have to take part?

It is up to you to decide. We will describe the study and go through the information sheet, which we will give to you. We will then ask you to sign a consent form to show you agreed to take part. You are free to withdraw at any time, without giving a reason.

4. What will I be asked to do?

If you decide you would like to take part, you would be asked to take part in one interview lasting between 45-60 minutes between July and October 2019 exploring your attitudes and experiences of E-cigarettes. During the interview you and the researcher will be the only people present, the interview will take place within the university building or an agreed public space. The interview will also be recorded on a Dictaphone and it is likely that the researcher will also be taking notes. The recorded interview will be transcribed at a later date by the interviewer.

5. Are there any risks if I participate?

There are no risks anticipated with participating in this study. However, if you experience any distress following participation you are encouraged to inform the researcher and she will provide support information.

6. Are there any advantages if I participate?

Although you may find participating interesting, there are no direct benefits in taking part. However, it is anticipated that the research will help us to understand adult smokers' and non-smokers' perceptions of E-cigarettes which will potentially add to the growing evidence regarding smoking cessation and therefore enable more effective health promotion.

7. What will happen with the data I provide?

When you agree to participate in this research, we will collect from you personally-identifiable information.

The Manchester Metropolitan University ('the University') is the Data Controller in respect of this research and any personal data that you provide as a research participant.

The University is registered with the Information Commissioner's Office (ICO) and manages personal data in accordance with the General Data Protection Regulation (GDPR) and the University's Data Protection Policy.

We collect personal data as part of this research (such as name, telephone numbers or age). As a public authority acting in the public interest, we rely upon the 'public task' lawful basis. When we collect special category data (such as medical information or ethnicity) we rely upon the research and archiving purposes in the public interest lawful basis.

Your rights to access, change or move your information are limited, as we need to manage your information in specific ways in order for the research to be reliable and accurate. If you withdraw from the study, we will keep the information about you that we have already obtained.

We will not share your personal data collected in this form with any third parties.

If your data is shared this will be under the terms of a Research Collaboration Agreement which defines use and agrees confidentiality and information security provisions. It is the University's policy to only publish anonymised data unless you have given your explicit written consent to be identified in the research. **The University never sells personal data to third parties.**

We will only retain your personal data for as long as is necessary to achieve the research purpose.

Anonymity is guaranteed, but realistically the data will not be kept 'confidential' as some of the information will be shared and possibly published. However, it is essential for you to know at all times you will remain anonymous and will not be identifiable.

The data collected for this study will be stored securely and only the researcher conducting this study will have access to this data:

- o Audio recordings will be destroyed and/or deleted once the project has been submitted for publication/examined
- o The files on the computer will be encrypted (that is no-one other than the researcher will be able to access them) and the computer itself password protected.
- o At the end of the study, hard copies of consent forms will be scanned. The electronic files will be saved on a computer for ten years. At the end of this period, they will be destroyed.
- o The typed version of your interview will be made anonymous by removing any identifying information including your name. Anonymised direct quotations from your interview may be used in the reports or publications from the study, so your name will not be attached to them.

o All your personal data will be confidential and will be kept separately from your interview responses.

There are some limits to confidentiality: if what is said in the interview makes me think that you, or someone else, is at significant risk of harm, I will have to break confidentiality and speak to a member of University academic staff about this. If possible, I will tell you if I have to do this.

For further information about use of your personal data and your data protection rights please see the University's Data Protection Pages (<https://www2.mmu.ac.uk/data-protection/>).

What will happen to the results of the research study?

The results will be summarised and reported in a thesis and may be submitted for publication in an academic or professional journal. However, as stated previously at all times any information you shared will remain anonymous and unidentifiable. If you wish to find out the results you can contact the researcher on the email address provided below.

Who has reviewed this research project?

This study has been reviewed and approved by the Manchester Metropolitan University Research Ethics Committee. The first research supervisory team have also reviewed the research.

Who do I contact if I have concerns about this study or I wish to complain?

If you wish to make a complaint or raise concerns about any aspect of this study and do not want to speak to the researcher, you can contact:

Alison Lloyd

Research Ethics and Governance Manager

Tel: +44 (0)161 247 2818 | Email: a.lloyd@mmu.ac.uk Manchester Metropolitan University
| Manchester | M15 6GX

If you have any concerns regarding the personal data collected from you, our Data Protection Officer can be contacted using the legal@mmu.ac.uk e-mail address, by calling 0161 247 3331 or in writing to: Data Protection Officer, Legal Services, All Saints Building, Manchester Metropolitan University, Manchester, M15 6BH. You also have a right to lodge a complaint in respect of the processing of your personal data with the Information Commissioner's Office as the supervisory authority. Please see: <https://ico.org.uk/global/contact-us/>

Appendix 3: An example Consent Form

Consent Form

A Qualitative Investigation into Smokers' and Non-Smokers' Accounts of E- Cigarette (EC) Use

Before you consent to participating in the study, please read the participant information sheet and mark each box below with your initials if you agree. If you have any questions or queries before signing the consent form please ask the researcher.

1. I confirm that I have read the Participant Information Sheet Date: (.../.../...) (version number 3) and fully understand what is expected of me within this study.
2. I confirm that I have had the opportunity to ask any questions and to have them answered.
3. I understand that my interview will be audio recorded and then made into an anonymised written transcript.
4. I understand that audio recordings will be kept until the research project has been examined or published.
5. I understand that my participation is voluntary and that I am free to withdraw until (.../.../...) without giving any reason
6. I understand that once my data have been anonymised and incorporated into themes it might not be possible for it to be withdrawn, though every attempt will be made to extract my data, up to the point of publication.
7. I understand that the information from my interview will be pooled with other participants' responses, anonymised and may be published.
8. I consent to information and quotations from my interview being used in reports, conferences and training events.
9. I understand that any information I give will remain anonymous unless it is thought that there is a risk of harm to myself or others, in which case the principal investigator will/may need to share this information with his/her research supervisor.
10. I consent to Manchester Metropolitan University keeping written transcriptions of the interview for 10 years after the study has finished.
11. I consent to take part in the above study.

Name of Participant _____ **Signature** _____ **Date** _____
Name of Researcher _____ **Signature** _____
Date _____

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Appendix 4: An example De-brief sheet

Debrief Sheet

Thank you very much for taking part in my research. The data you contribute to understanding the factors that act as facilitators and barriers in regard to E-cigarette use.

What happens now?

A transcript of our interview will be typed up in the weeks following our meeting. Two weeks following the interview you will have the right to withdraw from the study if you no longer wish your data to be used. If this is the case, please contact me via email (provided below). After this period, the transcript will be analysed and collated together with other interview transcripts and I will be unable to extract and delete your individual data.

If you would like a brief summary of the results, I would be happy to send this to you upon the study's completion. Please let me know if you do require this summary so I can make a note and ensure that I send it to you.

What do I need to do if I would like to speak to someone following the interview?

I hope you found the interview to be an interesting experience. If, however, the experience has brought up difficult feelings, or left you feeling distressed, I would encourage you to contact one of the services listed below:

Smokefree National Helpline:

0300 123 1044

[//www.nhs.uk/smokefree/help-and-advice/support#vLpuULRzCwQXM43d.99](https://www.nhs.uk/smokefree/help-and-advice/support#vLpuULRzCwQXM43d.99)

Action on Smoking and Health

0207 404 0242

enquiries@ash.org.uk

Finally, if you have any further questions, or want an update on the research, please feel free to contact me using the details provided:

georgia.wilson@stu.mmu.ac.uk

Thank you again for taking part, your input was invaluable.

Appendix 5 – Finalised questions from Study One

Question	Participant Category
What do you know about E-cigarettes (what are they used for, how do they work, types of devices, disposability, liquids available, etc.)? Please provide as much detail as possible	1,2,3,4,5,6
(Following a closed-ended multiple choice question asking: Where would you say you have acquired the majority of your knowledge about E-cigarettes?) Out of the options you have selected please discuss which has been the most influential and why you think this is in as much detail as possible	1,2,3,4,5,6
What do you think are the positive effects of using an E-cigarettes and why? Please provide as many examples as you can	1,2,3,4,5,6
What do you think are the negative effects of using an E-cigarettes and why? Please provide as many examples as you can	1,2,3,4,5,6
What are your opinions on the use of E-cigarettes to help people to stop smoking? Please provide as much detail as possible	1,2,3,4,5,6
(Closed question: do you think e-cigarettes are addictive?) Please explain in as much detail as possible your reasons behind this	1,2,3,4,5,6
(Closed question: On a scale of 1-5 (1 = Strongly Disagree, 5 = Strongly Agree) please rate how much you agree with the following statement by selecting the appropriate box: 'E-cigarettes encourage non-smokers to start using tobacco cigarettes') Please discuss the reasons behind your rating in as much detail as possible	1,2,3,4,5,6
The legal age of sale for E-cigarettes in the United Kingdom is 18 years of age, what is your opinion regarding this? Please provide as much detail as possible	1,2,3,4,5,6
What do you want to know about E-cigarettes?	1,2,3,4,5,6
Which aspects of E-cigarettes do you think requires more research?	1,2,3,4,5,6
Please describe the details of your tobacco use before you started using an E-cigarette (i.e., how often did you smoke, when did you start smoking, how long did you smoke for, how much you spent on tobacco, why did you want to quit, etc.?) in as much detail as possible	1,2,3
Please discuss in as much detail as possible your first E-cigarette experience, exploring to how this has changed overtime with reference to the generation, the brand the flavour liquid, the nicotine content, etc.	1,2,3,5
Are there any characteristics that are important to you when purchasing an E-cigarette that have not been mentioned?	1,2,3,5
Out of the characteristics you have selected, please discuss the characteristic(s) you have rated the highest and why in as much detail as possible	1,2,3,5
In regard to e-liquid flavours, what are your preferences and why?	1,2,3,5
Please describe the details of where you purchase your E-cigarette products and the reasons behind this	1,2,3
You have successfully used an E-cigarette to quit smoking: please provide a detailed step-by-step description in as much detail as possible of how you did this (including any details of other forms of quitting support), and why you think you were able to quit	1
Is there anything you could suggest from your experience that could make E-cigarettes more efficient in helping users quit conventional smoking?	1,2,3,4

As you claimed, you failed to quit smoking using an E-cigarette: please provide a step-by-step description in as much detail as possible of how you did this (including any details of other forms of quitting support), and why you think you were unable to quit	2
Please explain in as much detail as possible why you smoke conventional cigarettes and use an E-cigarette rather than using just one or the other	3
Why did you start using an E-cigarette?	1,2,3,5
Based on your experience is there anything you could suggest that would prevent non-smokers trying e-cigarettes?	5
Why have you never smoked tobacco cigarettes?	6
Why have you never used an E-cigarette?	6
Is there anything else you would like to add?	1,2,3,4,5,6

Appendix 6 – Demographic information sheet

What is your age?

___ years

What is your gender?

Female

Non-binary

Third gender

Prefer to self-describe _____

What is your ethnicity?

- a. White (Northern Irish/British/Irish)
- b. Mixed/multiple ethnic groups
- c. Asian/Asian British
- d. Black/African/Caribbean/Black British
- e. Other ethnic group, please state: _____

Appendix 7: Semi-Structured Interview Schedule

Questions and probes (Find out category of participant)	Participant Category 1,2,3,4,5,6
Invite participant to introduce themselves, and discuss their cigarette/e-cigarette experience/attitudes	1,2,3,4,5,6
Smoking experience/alternative quit attempts etc.	1,2,3,4
What were the main factors that encouraged you to use an E-cigarette? (how/why?)	1,2,3,4,5
What were the main factors that would of have deterred you to use an E-cigarette? (how/why?)	1,2,3,4,5
Generally, how would describe your experience of using an E-cigarette?	1,2,3,4,5
EC properties, i.e., generation, flavour, nicotine content (why/has this changed over time)?	1,2,3,4,5
Positives/negatives?	1,2,3,4,5,6
EC as a smoking cessation device or a recreational device (why/explore)?	1,2,3,4,5,6
Influence from others?	1,2,3,4,5,6
What do you think about information that is available regarding E-cigarettes? Trustworthy? (why/explore)	1,2,3,4,5,6
Is there anything you wish to know, but you feel you don't?	1,2,3,4,5,6
E-cigarettes as a stop smoking device/compared to NRTs? (why/explore)	1,2,3,4,5,6
Noticed health differences?	1,2,3,4,5
General health impacts?	1,2,3,4,5,6
How did/do you find using the device? (compared to cigarettes, any challenges etc.?)	1,2,3,4,5
Is cost a factor?	1,2,3,4,5
Environmental?	1,2,3,4,5,6
Current regulations?	1,2,3,4,5,6
Where do/would you buy products? Ease?	1,2,3,4,5
Is there anything you would like to add?	1,2,3,4,5,6

Appendix 8: Discussion Guide

Facilitator's welcome, introduction and instructions to participants

Demographic data: *It is important to collect anonymous demographic data from focus group participants. Simple questionnaires (asking age, gender and participant category) for this purpose will be handed out as participants arrive, then collected at the end of the focus group and kept with the tapes of the focus group*

Welcome: Thank you for volunteering to take part in this focus group. You have been asked to participate as your point of view is important. I appreciate your time.

Introduction: This focus group discussion is designed to assess your current thoughts, feelings and experiences about e-cigarettes. The focus group discussion will take no more than 90 minutes and will be audio recorded

Anonymity: Despite being taped, I would like to assure you that the discussion will be anonymous. The tapes will be kept safely in a locked facility until they are transcribed word for word, then they will be destroyed. The transcribed notes of the focus group will contain no information that would allow individual participants to be linked to specific statements. You should try to answer and comment as accurately and truthfully as possible. If there are any questions or discussions that you do not wish to answer or participate in, you do not have to do so; however please try to answer and be as involved as possible.

Ground rules

- The most important rule is that only one person speaks at a time. There may be a temptation to jump in when someone is talking but please wait until they have finished.
- There are no right or wrong answers
- You do not have to speak in any particular order
- When you do have something to say, please do so. There are many of you in the group and it is important that I obtain the views of each of you
- You do not have to agree with the views of other people in the group – if anything, it would be more interesting if you could share why you disagree (if you do). However, participants in this group have had different experiences with E-cigarettes, it is important that you respect other participants.
- Does anyone have any questions? (answers).

Warm up

- First, I'd like everyone to introduce themselves. Can you tell us your name (ask participants to use pseudonyms) and what category you feel best describes you?

Introductory questions

- I am just going to give you a minute or so to think about your experience with E-cigarettes and if possible, could you take it in turn to share this with the rest of the group – encourage to tell 'story'

Guiding questions

- What do you think are the positives/negatives of E-cigarettes? If negative, how could this be rectified?
- What factors do you think encourage people (or yourself) to use e-cigarettes?
- What factors do you think deters people (or yourself) from using e-cigarettes?

- How do you view E-cigarettes in comparison to cigarettes?
- What do you think are the risks (health and social) associated with E-cigarettes? How can this be rectified? (if participants don't think there are any health risks as why)
- How do you think E-cigarettes could be more successful in helping people quit smoking? And how do they compare to other NRTs?
- What do you think about E-cigarettes as a recreational product?
- What do you think should be done to prevent younger generations and non-smokers using E-cigarettes?
- What do you think about the current laws/restrictions on E-cigarettes – and do you think these should be changed? If so, how would you change them?
- What do you think about the availability of e-liquid flavours? Do they encourage or deter use? (Smokers and ex-smokers -did they help with the quit attempt?)

What do you think are the most pertinent topics that have been discussed throughout the activity and why?

As a group could we come up with three words that best sum up or summarise the key topics of discussion from today's session?

Conclusion

- Thank you for participating. This has been a very successful discussion
- Your opinions will be a valuable asset to the study
- We hope you have found the discussion interesting
- If there is anything you are unhappy with or wish to complain about, please contact me pm the email provided on the participant information sheet or the de-brief
- I would like to remind you that any comments featuring in this report will be anonymous
- Before you leave, please hand in your completed personal details questionnaire

